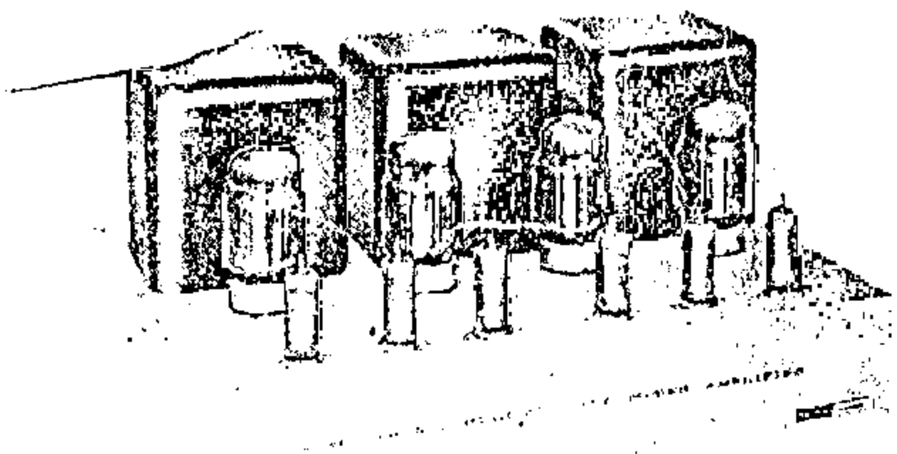
MANUAL

CITATION II

120 WATT STEREOPHONIC BASIC AMPLIFIER



CITATION II

harman kardon

INTRODUCTION

It is essential that you read this instruction booklet carefully before installing your high fidelity system. You have invested in the very finest electronic instrument available. It represents the culmination of years of research and experimentation to achieve the ultimate in high fidelity design. This booklet has been written in simple non-technical language and if you will take time to read it first before doing anything else, you will find it simple to obtain optimum performance from your Harman-Kardon Citation II Stereophonic Basic Amplifier.

Be sure to keep this booklet available at all times. It contains indispensable technical and service information.

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BASIC SPECIFICATIONS

SUSTAINED POWER OUTPUT:	60 watts per channel.
PEAK POWER OUTPUT:	130 watts per channel.
HARMONIC DISTORTION:	Less than 0.5%, 20- 20,000 cycles per second at 60 watts. Less than 0.1%, 20- 20,000 cycles per second at 20 watts. Unmeasurable at normal listening level.
INTERMODULATION DISTORTION:	Less than 0.5% at 60 watts. Less than 0.2% at 20 watts. Unmeasurable at normal listening level.
FREQUENCY RESPONSE:	60 watts. 18- 40,000 cycles per second +0, —1.0 db. 20 watts. 12- 60,000 cycles per second +0, —1.0 db. 1 watt. 2- 80,000 cycles per second +0, —1.0 db.
OUTPUT IMPEDANCE:	4, 8, and 16 ohms per channel.
DAMPING FACTOR:	Greater than 18.
FEEDBACK	Total 30 db. Achieved through multiple loops.
HUM AND NOISE:	Better than 90 db below 60 watts.
POWER SUPPLY:	Close B+ regulation through use of low Z silicon diode rectifier power supply.
SENSITIVITY:	1.5 volt RMS input for 60 watts.
STABILITY:	Unconditionally stable under any load.
INPUT RECEPTACLES:	One for each channel. One input for A.C. balance adjustment.
CONVENIENCE RECEPTACLE:	One A.C. convenience receptacle.
CONTROLS:	Four bias adjust controls. One for each output tube. Two A.C. balance controls.
FUSE:	A.C. primary, externally accessible.
CONSTRUCTION:	Military terminal board construction with all components held to rigid tolerances.
TUBE COMPLEMENT:	Total 10 tubes, 5 semi-conductors. 6- 12BY7A pentodes, 4- KT88 beam power pentodes, 4 silicon rectifier diodes, and 1 selenium rectifier.
POWER CONSUMPTION:	350 watts.
DIMENSIONS:	16⅜" wide x 9" high x 11½" deep.
WEIGHT:	60 lbs.
FINISH:	Charcoal brown and gold.

FEATURES

- Use of video output pentodes in all low level stages for exceptionally wide frequency response and low distortion.
- Output stage consists of two KT88's per channel, conservatively operated in fixed bias, distributed load circuit.
- Multiple feedback loops for increased degree of usable feedback to greatly lower distortion without sacrificing stability. 30 db overall.
- Low internal impedance power supply consists of 4 Silicon Rectifier Diodes, choke and heavy duty electrolytics, with potted power transformer for close regulation.
- Extended frequency response. Two octaves above and below the normal range of hearing, for smooth, transparent sound.
- Absolute stability with any load!
- Output transformers designed specifically for this amplifier to exacting specifications.
- High power output at the extreme ends of the range, enables the amplifier to effortlessly drive any of today's inefficient speakers at any power level. High power rating insures flawless, transparent reproduction at low listening levels.
- Military construction for neat professional appearance.
- Bias meter to adjust individually the plate current of each KT88, for proper balance and lowest distortion. This will insure optimum performance even after aging of the output tubes.
- Use of special glass resistors and heavy duty condensers for long life and trouble-free performance. All components are conservatively operated.

TECHNICAL DESCRIPTION

Extensive listening studies reveal that the behavior of a high fidelity amplifier several octaves above and below the normal range of human hearing distinctly colors the reproduced sound. It has been determined that an amplifier having a wide frequency response at useable power levels below 5 cycles has a tight and clearly defined low end, particularly in the 40- 100 cycles region.

A similar condition applies to the performance of an amplifier in the high frequency spectrum. If an amplifier limits its high frequency response to slightly above the limit of audibility, it may have a tendency toward strident reproduction and poor differentiation of instruments in the high overtones. Conversely, an amplifier which has a frequency response beyond 100,000 cycles without evidence of ringing or instability with reactive loads will offer clean, transparent tone qualities in the higher frequencies with excellent instrument separation.

It is for this reason as well as other considerations that conventional power amplifier design has been bypassed in the general design concept of this basic amplifier.

Current power amplifier design is based upon "single loop" feedback techniques, and linearization is obtained by overall feedback from the voice coil terminals to the cathode of the input tube. Stability problems limit this application to 20- 26 db of useable feeback, which represents a 10/1 to 20/1 reduction in distortion.

Careful listening evaluation of amplifier performance proves conclusively that extremely stable amplifiers with higher degrees of feedback provide a noticeable improvement in sound quality and a definite reduction in listening fatigue. This improvement can be attributed to lower harmonic and intermodulation distortion products, more linear phase characteristics, and improved transient response.

A "multiple loop" approach toward increasing the degree of useable feedback is the most logical approach to lower distortion without sacrificing stability. These "multiple loops" become additive if their ratio is adjusted to the relative degree of distortion produced. Thus, if one stage has twice the distortion of another, it should have twice as much feedback around it. Experiment has shown that the equivalent of 30 db overall feedback is safely reached by this approach.

It is essential to have a well regulated power supply in order to maintain clear transient response. The power supply of this amplifier incorporates four Silicon Rectifier Diodes, which together with extremely low copper loss in the power transformer provides regulation equivalent to that of a regulated supply. Leakage inductance in the output transformers has been kept to an absolute minimum, and the distributed capacitance of the primary halves have been carefully balanced against each other to maintain the natural resonances of the output transformers well above 200,000 cycles. The combined use of these special output transformers in conjunction with video pulse amplifier techniques and multiple feedback loops have enabled us to achieve the exceptionally wide frequency response of two octaves above and below the normal range of human hearing.

This design employs 2- KT88 beam power pentodes in each channel, driven by video power pentodes used conventionally in pulse amplifiers and wide band industrial equipment such as computers. All low frequency coupling networks have been inserted into internal feedback loops, thereby reducing phase distortion to an absolute minimum in the subsonic region. At the same time the high frequency response of the amplifier, exclusive of the output transformer, is flat to the megacycle region.

From the moment you turn this amplifier on and the stylus touches the record with an assured "thump", you will know you have purchased an exceptional instrument. Critical listening tests will reveal subleties in your records and tapes you never knew existed, and each performance will prove to be a new experience for you.

UNPACKING

Unpack the amplifier carefully and inspect it for signs of transit damage. The unit was subjected to numerous inspections and tests prior to final packing, and therefore should be in perfect operating condition. If damage is visible, notify your dealer at once. If the unit was shipped to you, notify the transportation com-

(Continued on Page 8)

3752092 Serial Number

RECOMMENDED CHANGES

Change R35 to 820Ω

Change R76 to 22Ω

Change R26,61 to 8.2kΩ

Change R29,30,64,65 to 15Ω **2W**

Change V7,8,9,10 to 6550 Tubes

NOTES:

UNLESS OTHERWISE SPECIFIED–

1-ALL RESISTANCE VALUES IN OHMS ± 10%

2-ALL RESISTORS 1/2 WATT

3-ALL CAPACITORS WITH DECIMAL VALUES IN MFD

4-ALL CAPACITORS WITHOUT DECIMAL VALUES IN MMF

5-ALL COMPONENTS MARKED WITH * MUST BE MATCHED

400PIV 750mA

175VAC across
Hi-Voltage Red & Red/White Leads

ZCOM3679 SILICON DIODES: SR1, SR2, SR3, SR4

117 VAC
60 CPS

440VDC w/ Load
465VDC No Load

INPUT CHANNEL B

INPUT CHANNEL A

CHANNEL B SP'KR OUTPUT

CHANNEL A SP'KR OUTPUT

SWITCH SHOWN IN EXTREME COUNTER-CLOCKWISE POSITION AS VIEWED FROM KNOB END OF SHAFT.

SWITCH POSITIONS
1-OFF
2-V10
3-V9
4-V8
5-V7
BIAS
6-CH A AC BAL.
7-CH B AC BAL.

METER

Bias Current =
100mA /Tube
1.50V across 15 ohm
Cathode Resistor

(Continued from Page 5)

pany without delay. Harman-Kardon will co-operate with you in such instances, but please note that only you can recover from the carrier for damage incurred during shipping.

Keep the shipping carton and all packing available in the event you have to return the amplifier for service.

HARMAN-KARDON CITATION II WARRANTY

We urge you to fill in your warranty card and mail it to the factory without delay to protect your rights under warranty. The warranty cards are carefully filed for reference and should you require information on the use of this high fidelity unit, or repair service, we will be able to identify your set and reply quickly.

CITATION II WARRANTY

We warrant each Citation II to be free from defects in material and workmanship under normal use and service, and in accordance with the conditions herein below set forth, for a period of 90 days from date of delivery to the original purchaser, and agree to replace or repair any part or parts, returned to us within said 90 days, with transportation prepaid and which our examination shall disclose to our satisfaction to have been thus defective. This warranty does not include free labor, nor is it applicable to any instrument which shall have been repaired or altered in any way so as in our judgment to affect its stability or reliability nor which has been subject to neglect, misuse, abuse, negligence or accident nor which has had the serial number altered, effaced, or removed. Neither shall this warranty apply to any instrument which has been connected otherwise than in accordance with instructions furnished by us.

This warranty is expressly in lieu of all other warranties, express or implied, and of all other obligations or liability on our part, and we neither assume nor authorize any representative or other person to assume for us any other liability in connection with the sale of this instrument.

NOTE: It is necessary to receive factory authorization before returning a set for repair. Write directly to us describing the specific difficulty, model and serial number of your unit. At times, by performing certain checks on your own you can save the expense of shipping the set to a warranty station or to the factory.

We reserve the right to refuse a unit at our factory or warranty station unless previous authorization has been given.

CONNECTING THE SPEAKERS

Your two speakers should be identical, if possible, to obtain optimum results. As this power amplifier is rated at 60 watts per channel, it is advisable to use speakers with high power handling capabilities. The speakers should be placed along the same wall approximately 8 to 15 feet apart, depending upon room size and furniture placement. It may be necessary to experiment with speaker placement until best results are obtained.

Use any type wire to connect your speakers to the Citation II power amplifier. Lamp cord ("zip cord") is excellent and may be easily dressed around the moulding for an inconspicuous and neat installation. Do not drive staples or tacks through the center of the wire, as this may result in a direct short between the two sections and will decrease the overall volume or short out the speakers entirely. It is permissible to use approximately 100 feet of lamp cord for each speaker without appreciable loss of volume.

Speakers are usually rated in terms of three impedance values, 4, 8, and 16 ohms. Several high quality speakers are rated at odd values which fall between the standard ratings. If your speakers correspond to the designations on the speaker output strips, attach one lead to the terminal marked "G" and the other lead to the appropriate impedance terminal corresponding with the rating of your speaker. If your speaker has an odd impedance value, choose the impedance connection closest to the speaker rating. It may be noted that a mismatch of as much as 50% may have very little effect on performance, and it is not critical to exactly match the speaker to the impedance terminal.

CONNECTING THE PREAMPLIFIER

Single conductor, shielded wire should be used to connect your monophonic or stereophonic preamplifier to the power amplifier. The Harman-Kardon Citation I stereophonic preamplifier incorporates two anode follower outputs which permit the use of up to 50 feet of cable in each channel without affecting the frequency response.

Connect one shielded lead from the preamplifier right output to the right input receptacle on the rear panel of the power amplifier. Connect an additional shielded lead between the left preamplifier output and the left input receptacle on the power amplifier.

WARNING: Do not remove or manipulate the input connections while the amplifier is powered. This may result in permanent damage to your speakers.

A.C. ELECTRICAL INSTALLATION

Connect the A.C. line cord into any outlet furnishing 117 volts, 50 or 60 cycles A.C. current. The voltage may vary between 110 and 125 volts.

An A.C. convenience receptacle is located on the rear panel of the amplifier. Any auxiliary equipment may be connected to this power receptacle and will be turned off with the power amplifier.

Do not place books or objects on top of the amplifier for this will restrict ventilation and may reduce tube and component life. Allow at least 4 inches above the amplifier for unrestricted circulation.

CONNECTING THE AMPLIFIER FOR 120 WATT MONOPHONIC OPERATION WITH SINGLE SPEAKER

In order to operate the Citation II as a 120 watt monophonic amplifier it is necessary to fulfill two requirements.

1. The speaker output terminals must be strapped together. Tie the two ground terminals in parallel and then tie either the two 8 or 16 ohm terminals in parallel depending on the nominal impedance of your speaker. For example, if you are using an 8 ohm speaker, tie the two 16 ohm terminals together and attach the speaker between either 16 ohm terminal and ground. If you are using a 16 ohm speaker it is permissible to connect it as described for an 8 ohm speaker, as a mismatch of as high as 50% will not affect the tone quality.
2. The amplifier input terminals must be tied together if no preamplifier is to be used and the signal is being fed directly by a tuner. If a monophonic preamplifier is used it is also necessary to tie the inputs together. This can be accomplished in any of several ways. One method would be to use two patch cords with RCA type phono plugs on one end. The other ends of these patch cords would be tied together in parallel and soldered to another type RCA phono plug. Connect the two individual RCA plugs to the input receptacles of the amplifier and the other end (which is paralled) to the output of your tuner. A more satisfactory method is to purchase a LAB-TRONICS patching plug, part #A-754 to parallel the inputs of the amplifier. This device would eliminate the need of soldering and would insure perfect connections.
3. If a stereo preamplifier is used input strapping is not required. Merely connect the two outputs of your preamplifier to the corresponding inputs of the Citation II and connect the speakers as previously discussed.

PROTECTIVE COVER

A handsome protective snap-on cover is available for use with this amplifier. The cover is supplied with complete mounting instructions.

TUBE REPLACEMENT

The use of balanced output tubes is preferred although not mandatory. There is a statistical rate of probability that matched tubes will age at a more equal rate than unmatched tubes requiring less frequent adjustment. If it is necessary to replace a KT88 output tube, it is advisable to replace both tubes of the channel. Matched KT88's are available at most stores or through Harman-Kardon.

FUSE

In the event of a potentially damaging failure of tubes or components, the Citation II is protected by a 8 amp GLH fuse, located on the rear panel. If this fuse blows, replace only with one of the same rating. Replacing with a fuse of a higher rating will not protect the amplifier, and may result in severe damage, which will not be covered by the factory warranty.

BIAS ADJUSTMENT

The four bias screwdriver potentiometers located on the rear panel have been factory adjusted for optimum performance. (This adjusts cathode current at 100 ma. per tube). It may be required to periodically readjust these bias potentiometers due to aging of the output tubes. Proceed in the following manner:

1. Set the meter selector switch (located on the rear panel) to the V10 position.
2. Adjujst the V10 bias potentiometer until the meter pointer is exactly at the "BIAS" mark. Repeat adjustment for V9, V8 and V7.
3. Repeat this entire process until no change in the meter setting is noticed as the meter selector switch is rotated through the various positions from V10 to V7.
4. This procedure should be repeated after the set has been allowed to operate continuously for approximately ½ hour.
5. At no time should this adjustment be made with an input signal feeding the basic amplifier. This operation establishes the D.C. quiescent point of the tubes, and must be performed without an input signal.

A.C. BALANCE ADJUSTMENT

A 60 cycle test signal has been provided so that the amplifier can be dynamically balanced. This signal is available next to the Channel B input jack. The upper jack is the input to the Channel B amplifier and the lower jack is the "test signal" source.

In addition a 16 ohm, 20 watt resistor is provided to connect to the speaker terminals as a load, while adjusting each channel.

Perform the following adjustments periodically to insure perfect A.C. balance.

1. Connect the 16 ohm, 20 watt wirewound resistor between ground (G) and the 16 ohm terminal on Channel A speaker terminal strip.
2. Rotate the meter selector switch to the Channel A A.C. Balance position.
3. Connect one end of a standard phono shielded patch cord (This is a shielded lead with a RCA male plug on either end) into the "TEST SIGNAL" jack. Connect the other end of this cord into the Channel A input. This should be done before energizing the amplifier. As the 16 ohm, 20 watt resistor will get quite hot, prolonged testing is not advisable.
4. Adjust the A.C. Balance control located on the top of the chassis between the two KT88 output tubes (V9 and V10) with a long screwdriver. Rotate the control to the right or to the left until the meter pointer aligns with the "BALANCE" mark.
5. Remove the patch cord from the Channel A input jack.
6. Rotate the meter selector switch to Channel B A.C. Balance position.

7. Allow sufficient time for the 16 ohm, 20 watt load resistor to cool and disconnect from Channel A speaker terminal. Connect the load resistor to Channel B speaker terminals between ground (G) and 16 ohms.
8. Connect the phono patch cord into Channel B input jack (the upper jack) and adjust the Channel B A.C. Balance control located on the top of the chassis between the two KT88 output tubes (V7 and V8) with your screwdriver. Rotate the control as before, either to the right or to the left until the meter pointer aligns with the "BALANCE" mark.
9. Remove the phono patch cord and the 16 ohm, 20 watt resistor and set aside for use later on.
10. This completes the A.C. balance adjustment. Throw the meter selector switch to "OFF". (The meter should not be allowed to operate for an extended period of time while playing the amplifier for this may result in damage to the meter movement.)
11. After about ½ hour of bench or playing time, repeat this adjjustment to insure minimum distortion. No further adjustments are necessary unless any of the tubes are replaced.

REPLACEMENT PARTS LIST

When ordering replacement parts be sure to specify the part number listed below.

Part Number	Description	Price
FT3273670	Power Transformer	39.35
FT3273671	Output Transformer	45.00
FC3273672	Choke	6.05
B3273674	Terminal Board, Channel A	4.65
B3273923	Terminal Board, Channel B	4.65
ZCOM3715	Fuse, 8 Amps—GLH	.25
M3274124	Meter	10.60
ER3273909	Meter Switch	1.80
RV3274149	Twin Pot	1.35
RV3274125	AC Balance Pot (single pot)	1.10
Z3273690	Selenium Rectifier	1.40
ZCOM3679	Silicon Diode (SD94A)	4.75
JE3273784	4 mfd/450 volts (Minimite)	1.00
JE3273681	40 mfd/525 volts	2.50
JE3273682	200mfd/250 volts	2.85
JE3273851	200mfd/250 volts (with insulating sleeve)	2.75
JE3273783	20-20 mfd/150 volts (with insulating sleeve)	1.50
JE3273683	50-50 mfd/450 volts	3.50
RWCOM3959	16 ohm W Wirewound	.40

VOLTAGE AND RESISTANCE CHARTS

VOLTAGE READINGS G550

	12BY7A	12BY7A	12BY7A	12BY7A	12BY7A	12BY7A	~~KT88~~	~~KT88~~	~~KT88~~	~~KT88~~
PIN	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
1	5V	150V	150V	5V	150V	150V	0.6V AC	NC	NC	NC
2	0V	110V	110V	0V	110V	110V	3.1V AC	3.1V AC	3.1V AC	3.1V AC
3	5V	150V	150V	5V	150V	150V	450V	450V	450V	450V
4	1.5V AC	3.1V AC	3.1V AC	1.5V AC	3.1V AC	3.1V AC	450V	450V	450V	450V
5	1.5V AC	3.1V AC	3.1V AC	1.5V AC	3.1V AC	3.1V AC	-45V*	-45V*	-45V*	-45V*
6	3.1V AC	3.1V AC	3.1V AC	3.1V AC	3.1V AC	3.1V AC	450V	450V	450V	450V
7	160V	285V**	285V**	160V	285V**	285V**	3.1V AC	3.1V AC	3.1V AC	3.1V AC
8	210V	340V	340V	210V	340V	340V	1.5V	1.5V	1.5V	1.5V
9	5V	150V	150V	5V	150V	150V	—	—	—	—

Readings may vary ±20%.

NOTE: All measurements to gnd. with VTVM—117 Line—No signal input. All voltages DC unless otherwise noted.
*Differences in these voltages are normal but cathode currents should be equal.
**These voltages will be equal with balanced tubes, but may differ without affecting performance.

RESISTANCE READINGS

	12BY7A	12BY7A	12BY7A	12BY7A	12BY7A	12BY7A	KT88	KT88	KT88	KT88
PIN	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
1	220 ohms	5K	5K	220 ohms	5K	5K	—	—	—	—
2	1M	1M	1M	1M	1M	1M	0.1 ohm	0.1 ohm	0.1 ohm	0.1 ohm
3	220 ohms	5K	5K	220 ohms	5K	5K	62 ohms	62 ohms	62 ohms	62 ohms
4	1 ohm	0.1 ohm	0.1 ohm	1 ohm	0.1 ohm	0.1 ohm	280 ohms	280 ohms	280 ohms	280 ohms
5	1 ohm	0.1 ohm	0.1 ohm	1 ohm	0.1 ohm	0.1 ohm	120K	120K	120K	120K
6	0.1 ohm	0.1 ohm	0.1 ohm	0.1 ohm	0.1 ohm	0.1 ohm	20 ohms	20 ohms	20 ohms	20 ohms
7	16K*	15K**	15K**	16K*	15K**	15K**	0.1 ohm	0.1 ohm	0.1 ohm	0.1 ohm
8	39K*	22K*	22K*	39K*	22K*	22K*	15 ohms	15 ohms	15 ohms	15 ohms
9	220 ohms	5K	5K	220 ohms	5K	5K	—	—	—	—

Readings may vary ±20%.

NOTE: *These readings are measured from B+ (the Junction of L1 & C15). All other readings to Ground.
** These readings are measured from B+ and depend on the position of the AC balance controls. They may vary ±25%.

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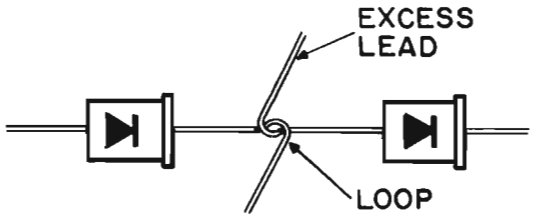
ADDENDUM SHEET – CITATION II

Before proceeding with the construction of your kit, please make the following changes in your assembly and operation manual.

A) Refer to page 10.

1) Change step 11 to read, "Hook cathode lead from SD1 with anode lead from SD2 (NS). Do not cut off excess wire. Fragile! Use caution handling leads." (See addendum pictorial, detail A.)

DETAIL A

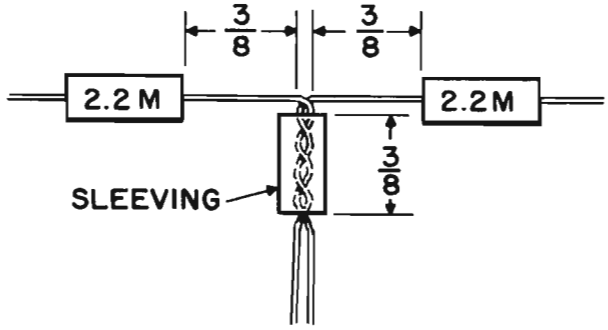


2) Change step 12 to read, "Hook anode lead from SD3 with cathode lead SD4 (NS). Do not cut off excess wire."

B) Insert the following 4 steps directly after step 16 on page 10.

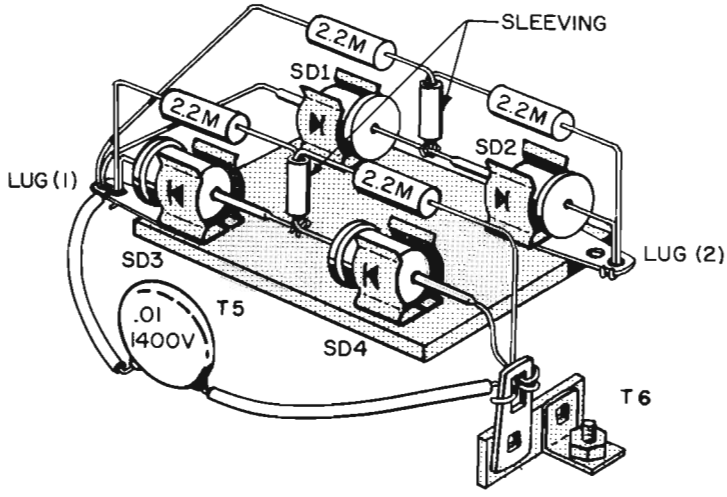
3) Twist a pair of 2.2 megohm ½ watt 10% resistors (red, red, green, silver) together as shown in addentum pictorial, detail B. Slip a small piece of sleeving over the twisted leads.

DETAIL B



4) Connect the twisted leads of the pair of 2.2 megohm ½ watt 10% resistors (red, red, green, silver) through the loop of SD1 and SD2 (S). Cut off excess wire. Connect one free end of the pair of resistors to T5 lug #1 (NS) and connect the other free end to T5 lug #2 (NS). See addendum pictroial, detail C.

DETAIL C

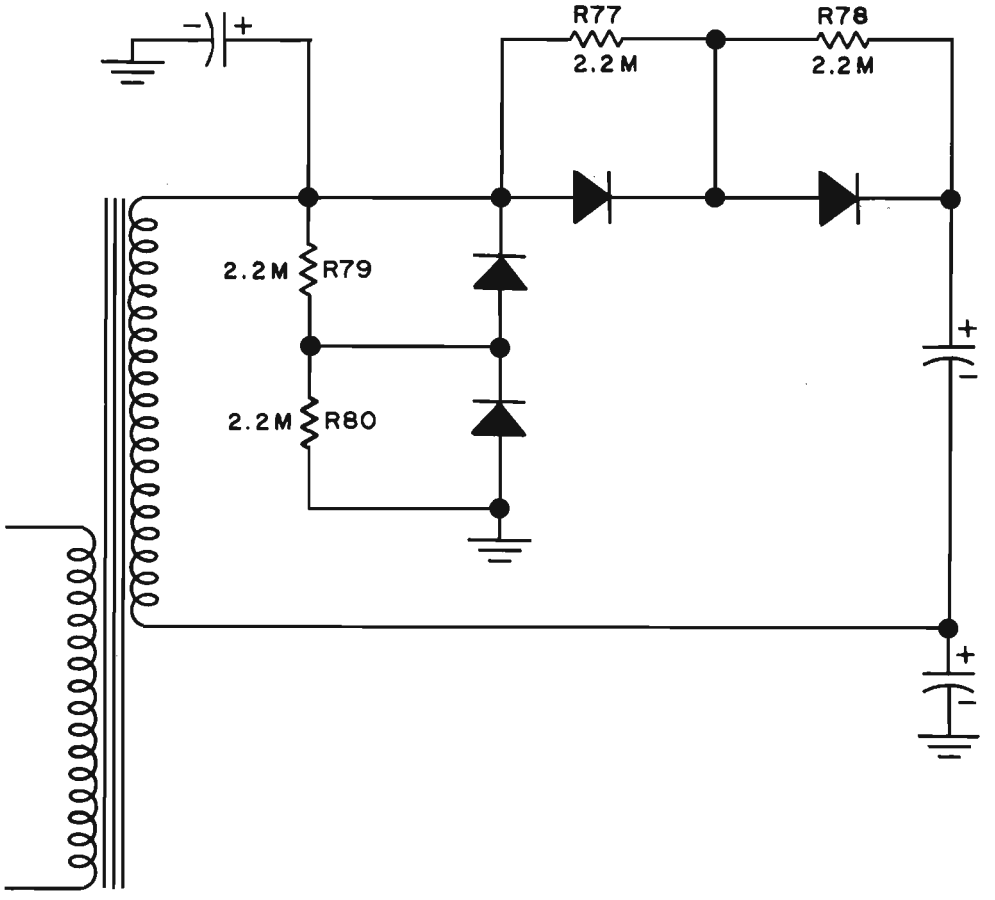


5) Prepare another pair of 2.2 megohm ½ watt 10% resistors (red, red, green, silver) following the procedure outlined in step 3 of this addendum.

6) Connect the twisted leads of the pair of 2.2 megohm ½ watt 10% resistors (red, red, green, silver) through the loop of SD3 and SD4 (S). Cut off excess wire. Connect one free end of the pair of resistors to T5 lug #1 (NS). Connect the other free end to T6 lug #2 (NS). (See addendum pictorial, detail C.)

C) Refer to detail D (schematic diagram). Add R77, R78, R79 and R80 to power supply section of schematic on page 18.

DETAIL D



D) Refer to page 34 (replacement parts list) add the following under "Resistors".

			2.2 megohm ½ watt 10%
RA 225-1	4		(red, red, green, silver)

E) Refer to page 16, step 15.

This step reads "Connect A 330 ohm ½ watt 5% resistor (orange, orange, brown, gold) from T4-3 (S) to T4-2 (NS)." Change this step to read "Connect a 300 ohm ½ watt 5% resistor (orange, black, brown, gold) from T4-3 (S) to T4-2 (NS).

F) Refer to page 19 (schematic diagram) change R76 value from 330 — 5% to 300 — 5% (connected to rotary switch — S1 front).

G) Refer to page 34 (replacements parts list under subheading resistors) line 4.

Change RA151—.5 ..... 1 .....330 ohms ½ watt 5% (orange, orange, brown, gold) to read "RA301—.5 ..... 1 ..... 300 ohms ½ watt 5% (orange, black, brown, gold)".

H) Refer to picotrial 5, lug strip T4. Change value of resistor connected from lug 2 to lug 3 to read 300 ohms.

BIAS ADJUSTMENT - LIT 2

With no signal input, but with 8 Ω load on speaker terminals measure with VTVM the bias voltage on the control grids (PIN 5) of each of the ④ output tubes to ground. Adjust each bias pot for equal voltage (-45V / ± 2 VOLTS).

Repeat above until all ④ bias readings are equal.

AC BALANCE ADJUSTMENT

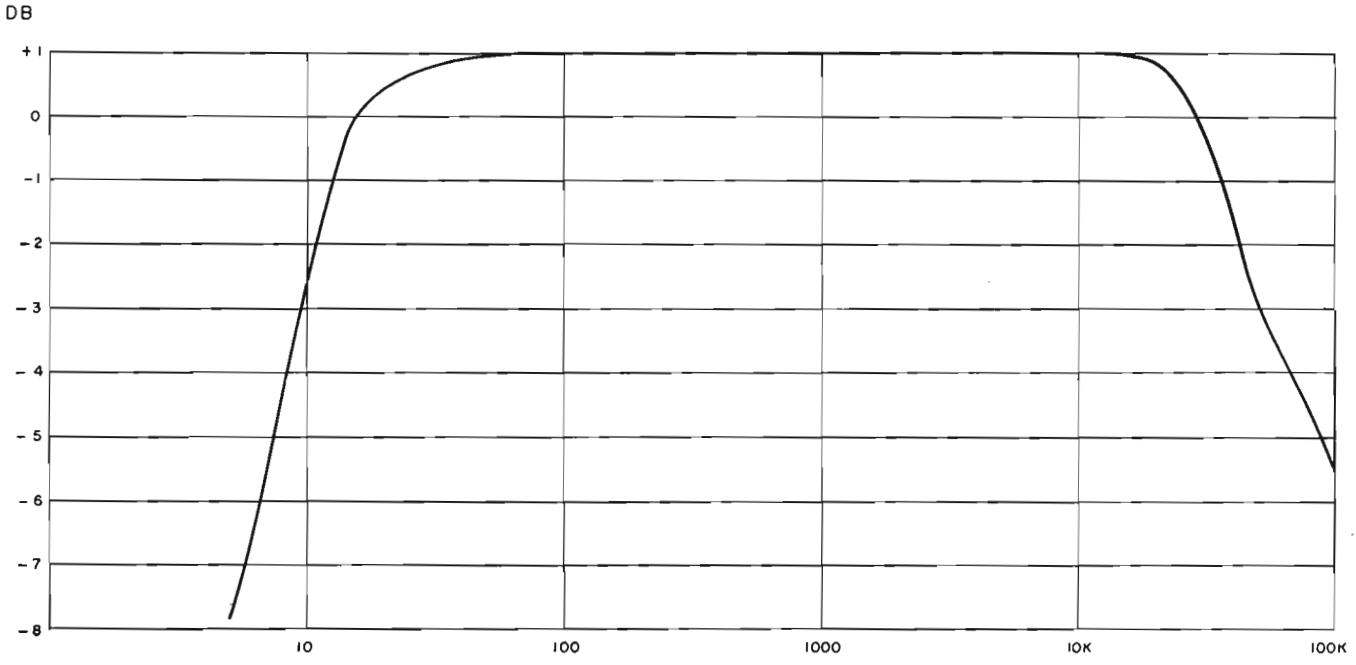
With loads still attached connect an oscilloscope to Speaker terminals

Inject signal of sufficient voltage to just produce "clipping" on the scope

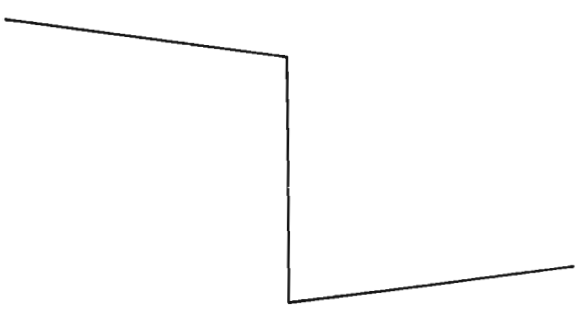
Adjust AC Balance pots so that the signal on the scope looks symmetrial

CITATION II CURVES

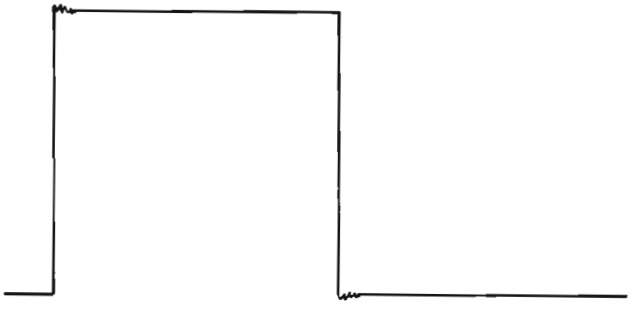
CITATION II POWER RESPONSE ODB = 60 WATTS



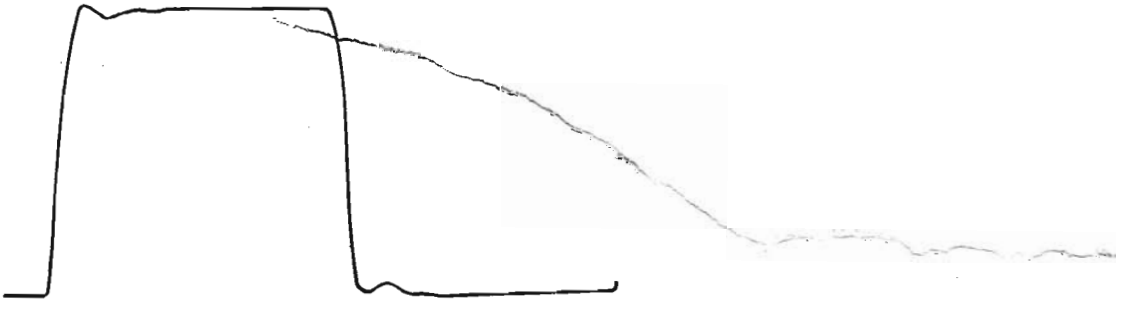
CITATION II SQUARE WAVE RESPONSE



10 CYCLES

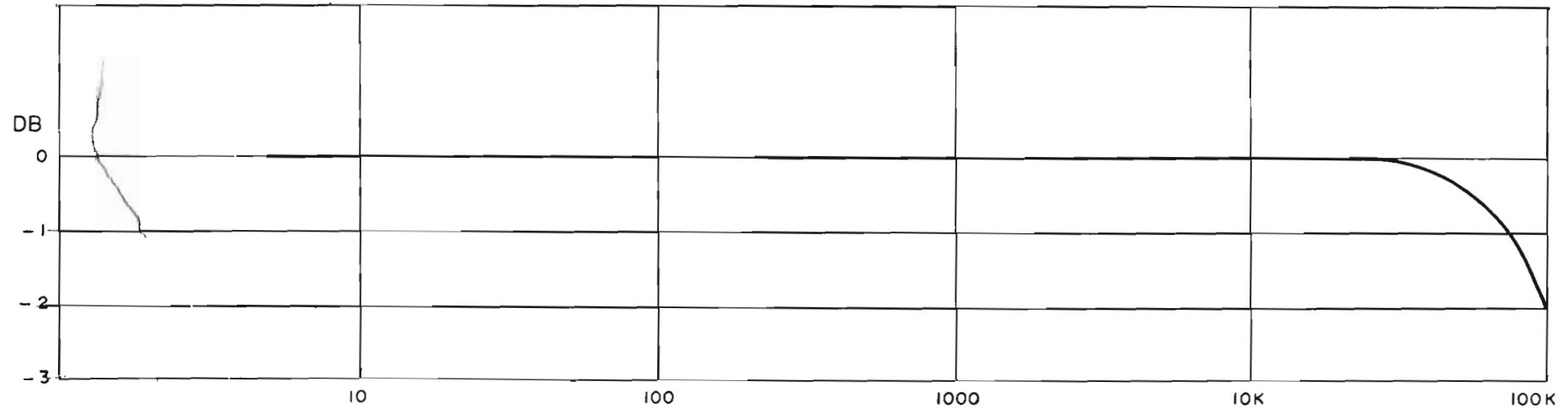


1000 CYCLES



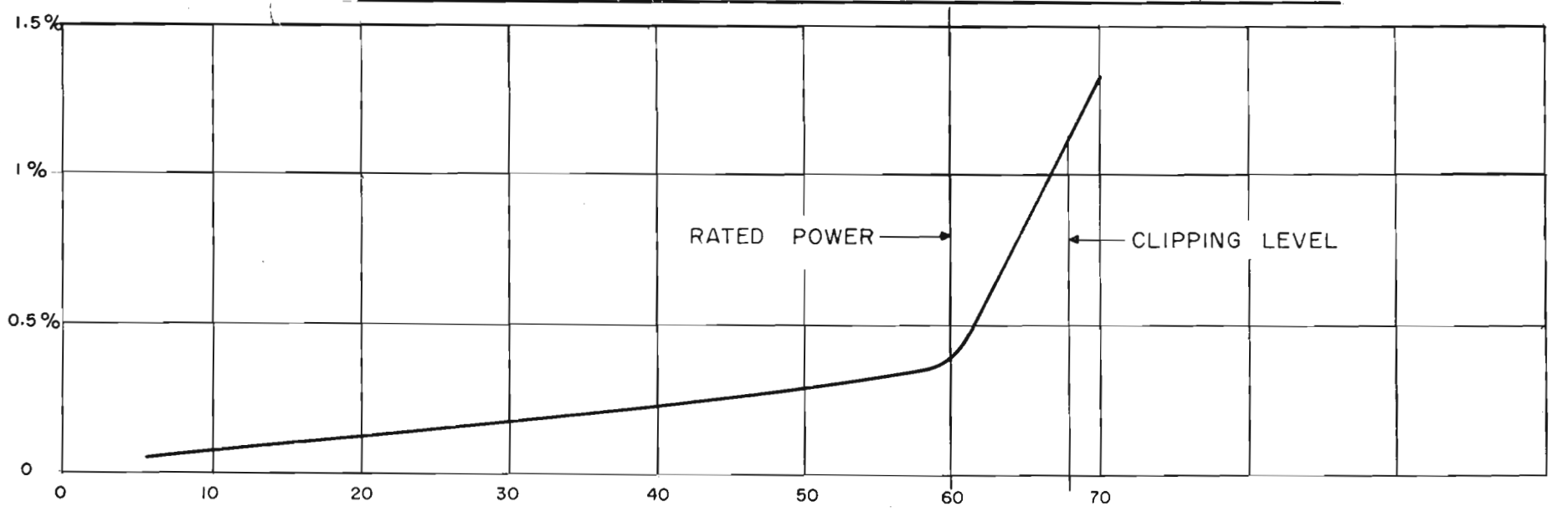
20,000 CYCLES

CITATION II FREQUENCY RESPONSE 0DB = 1 WATT

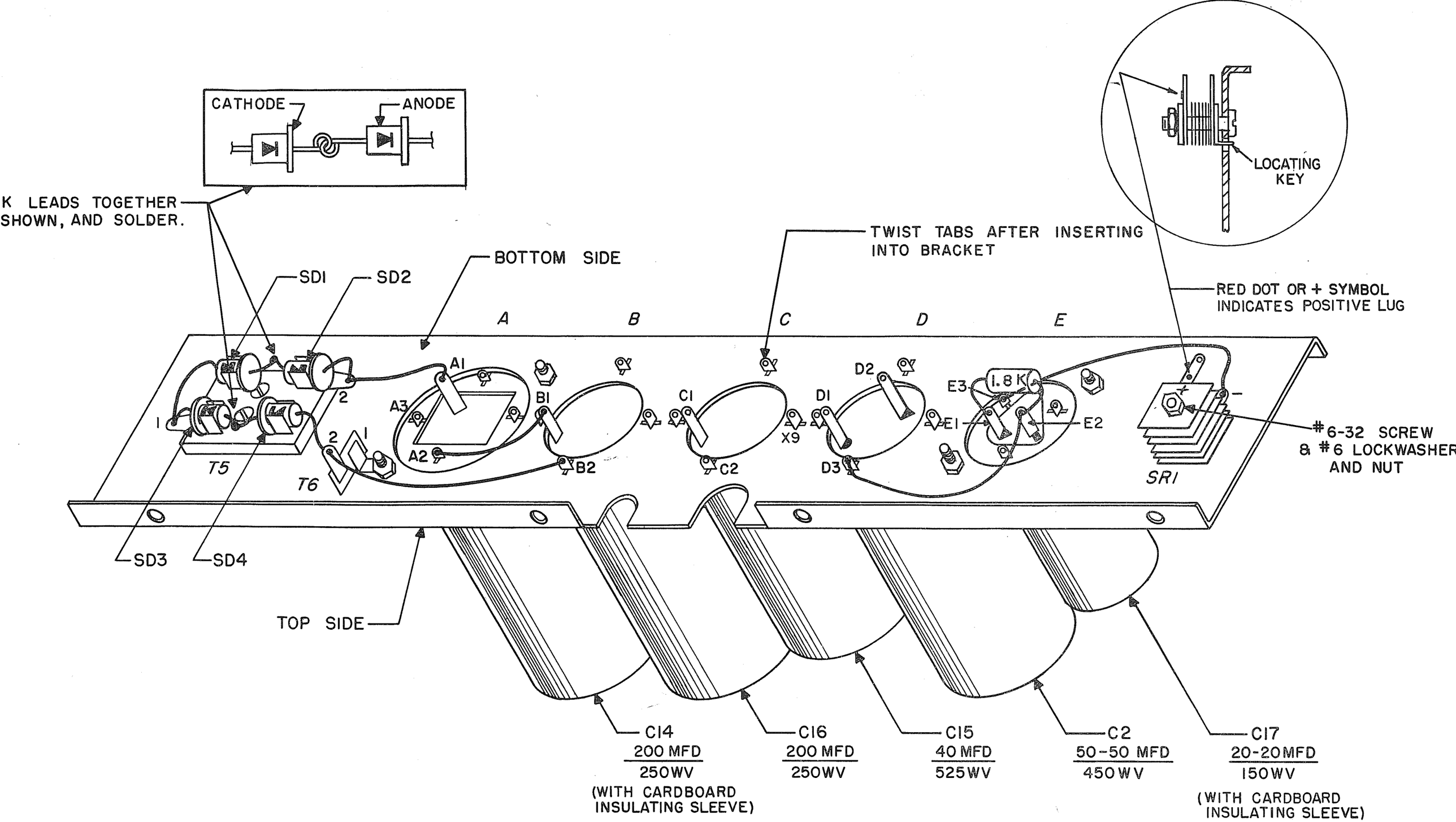


FREQUENCY IN CYCLES PER SECOND

CITATION II INTERMODULATION DISTORTION, 60 ∿ - 7KC 4:1, 16 Ω LOAD



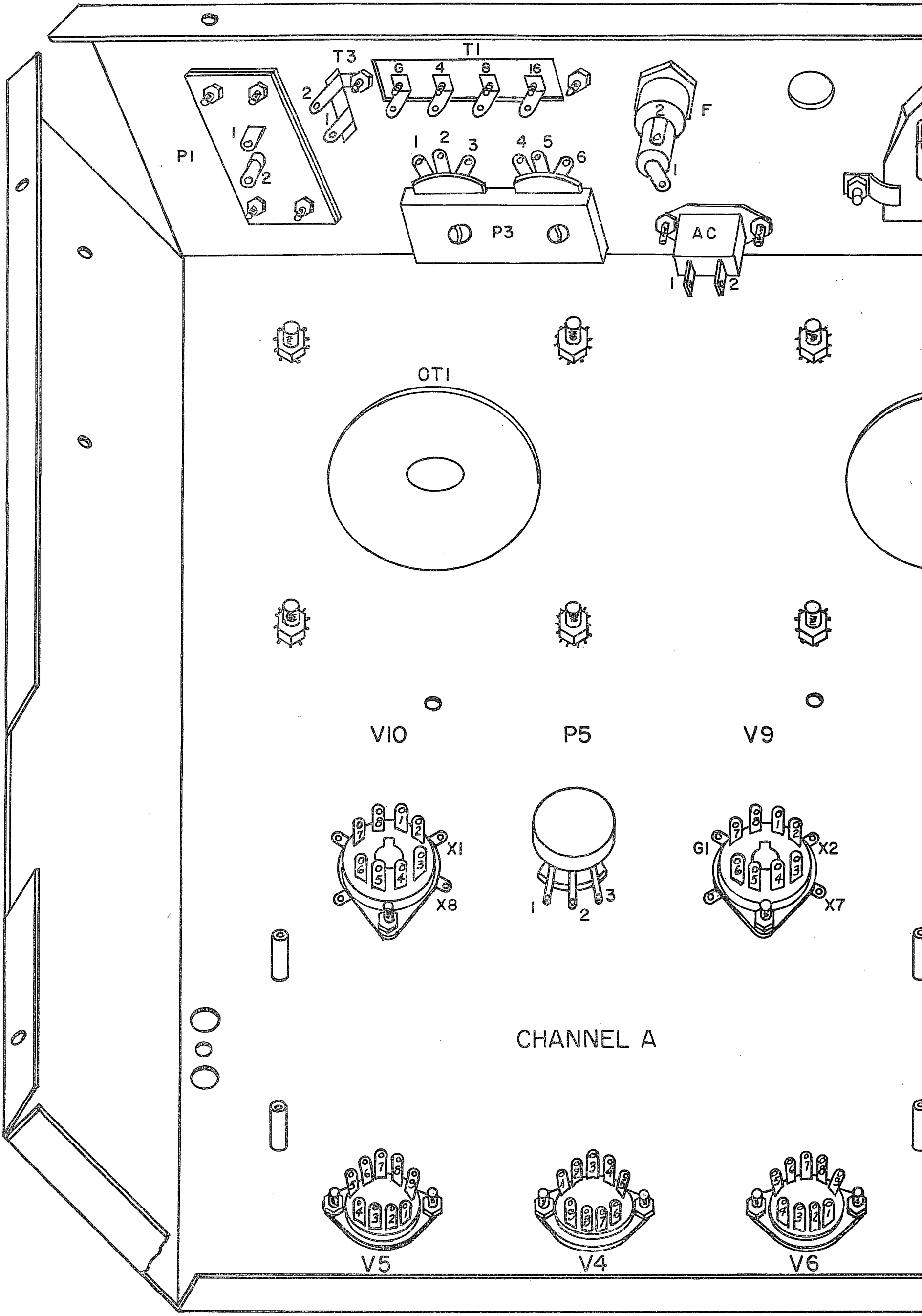
POWER OUTPUT - WATTS



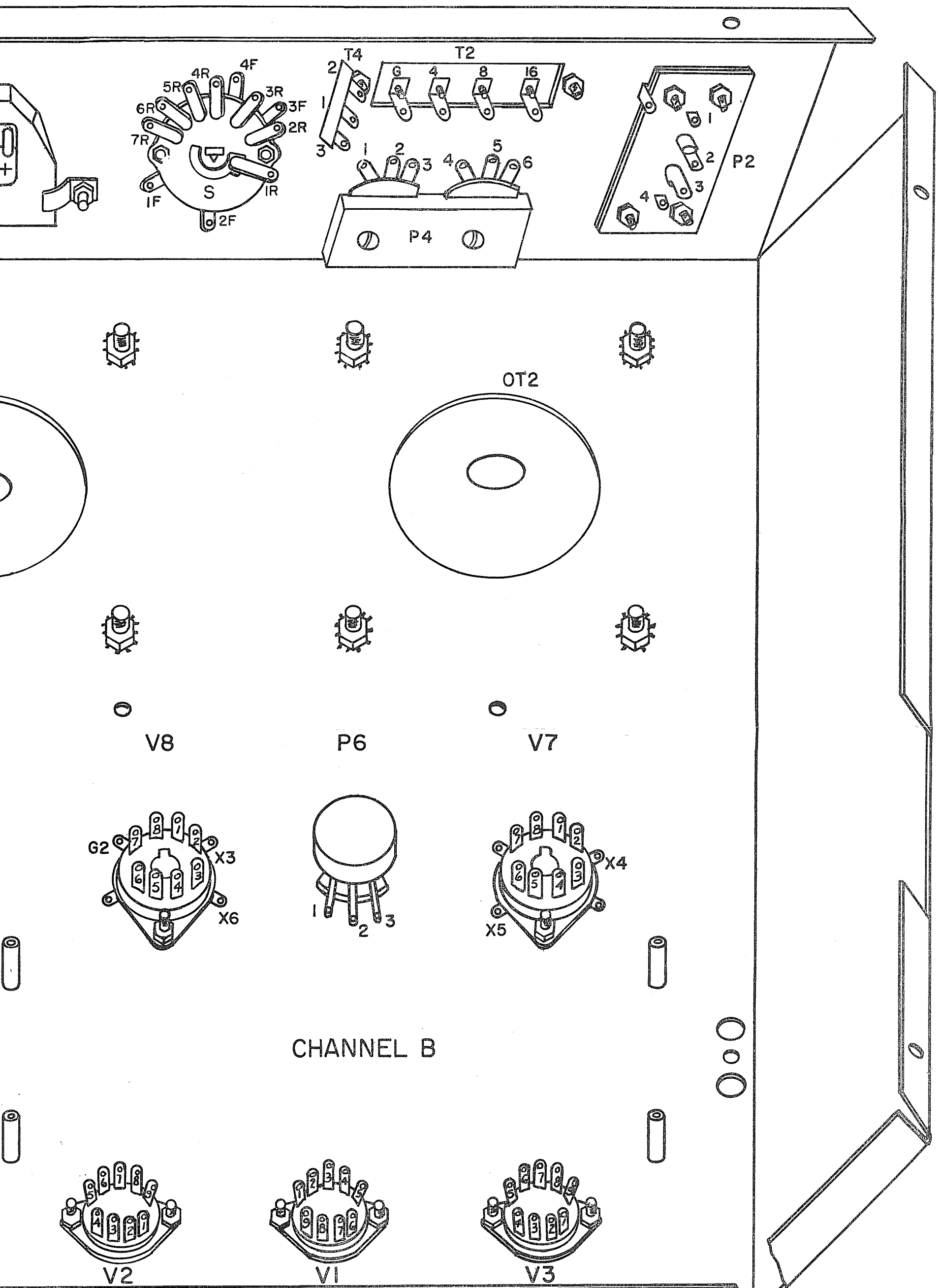
CITATION II

ELECTROLYTIC MTG. BRACKET

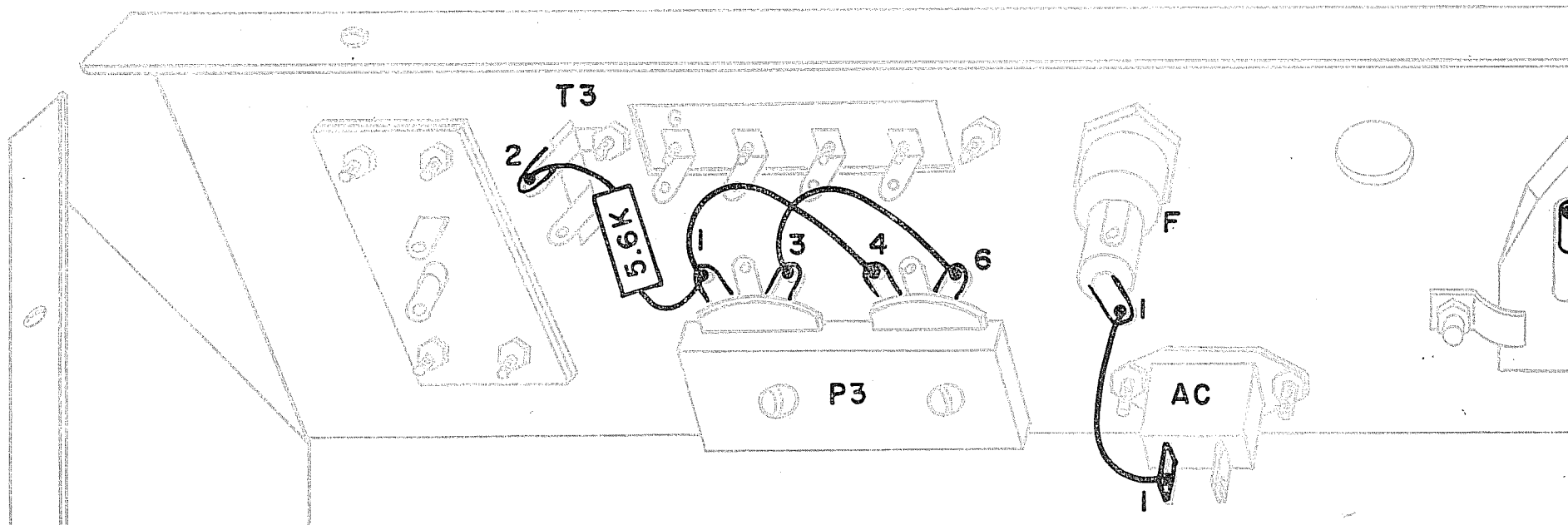
PICTORIAL 1

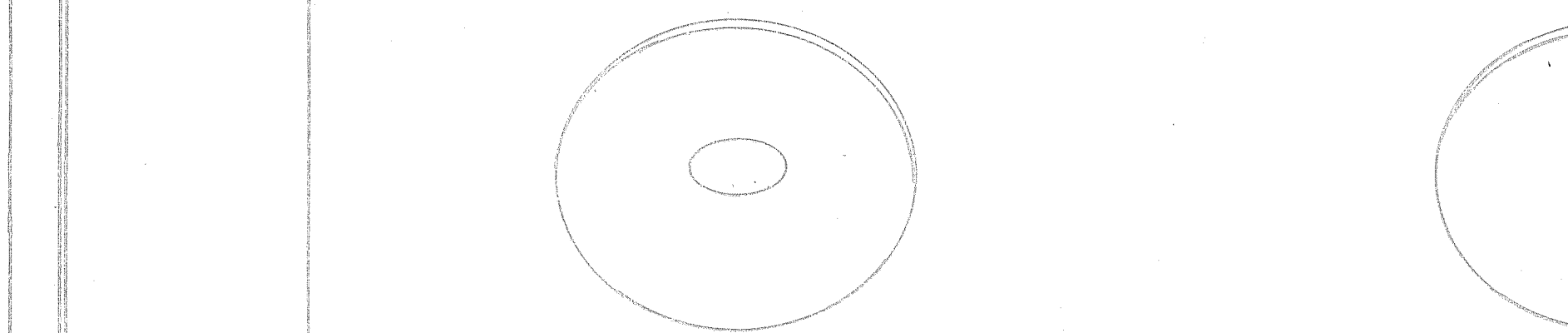


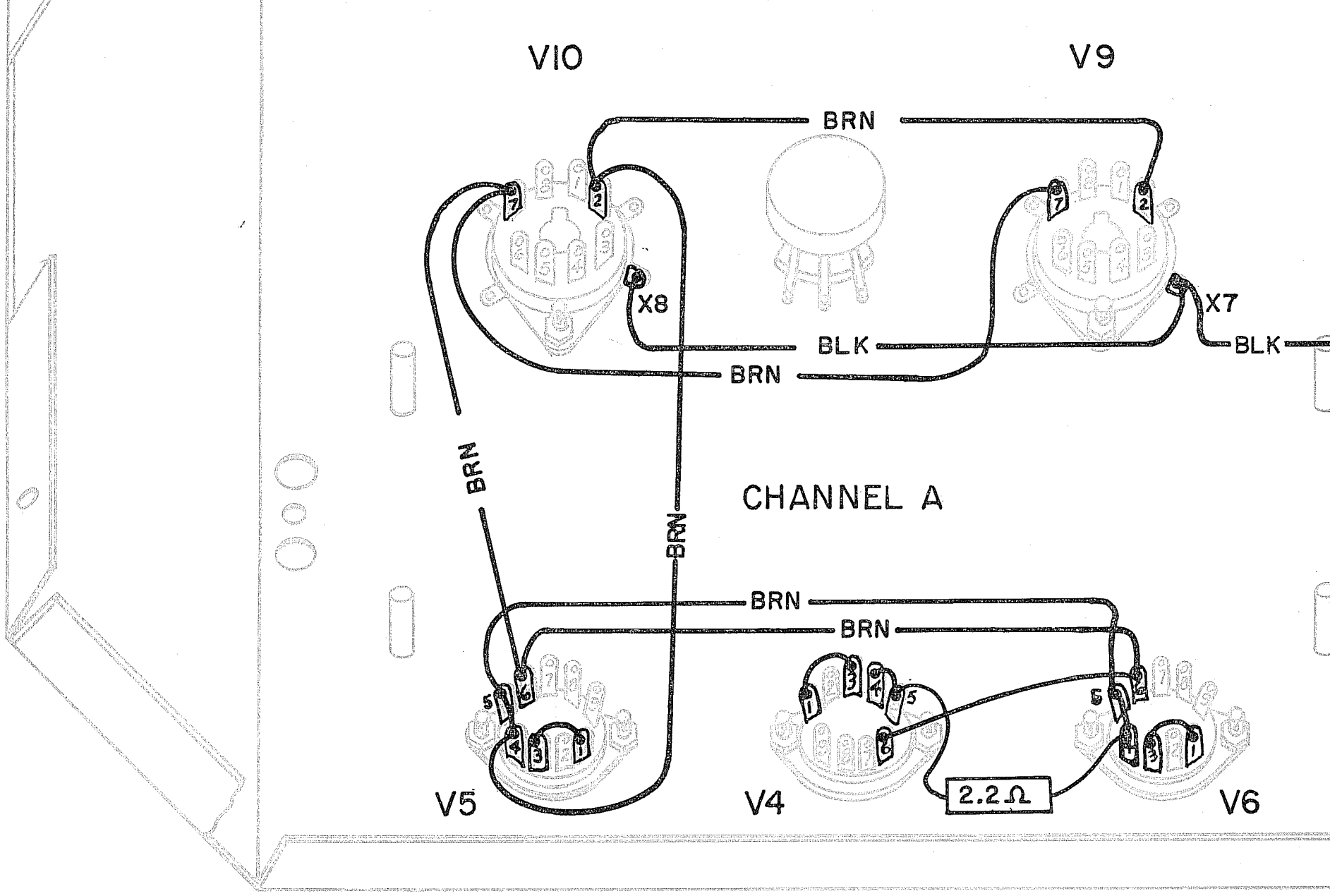
CIT
CHASSIS
PICT



ON II
SSEMBLY
RIAL 4



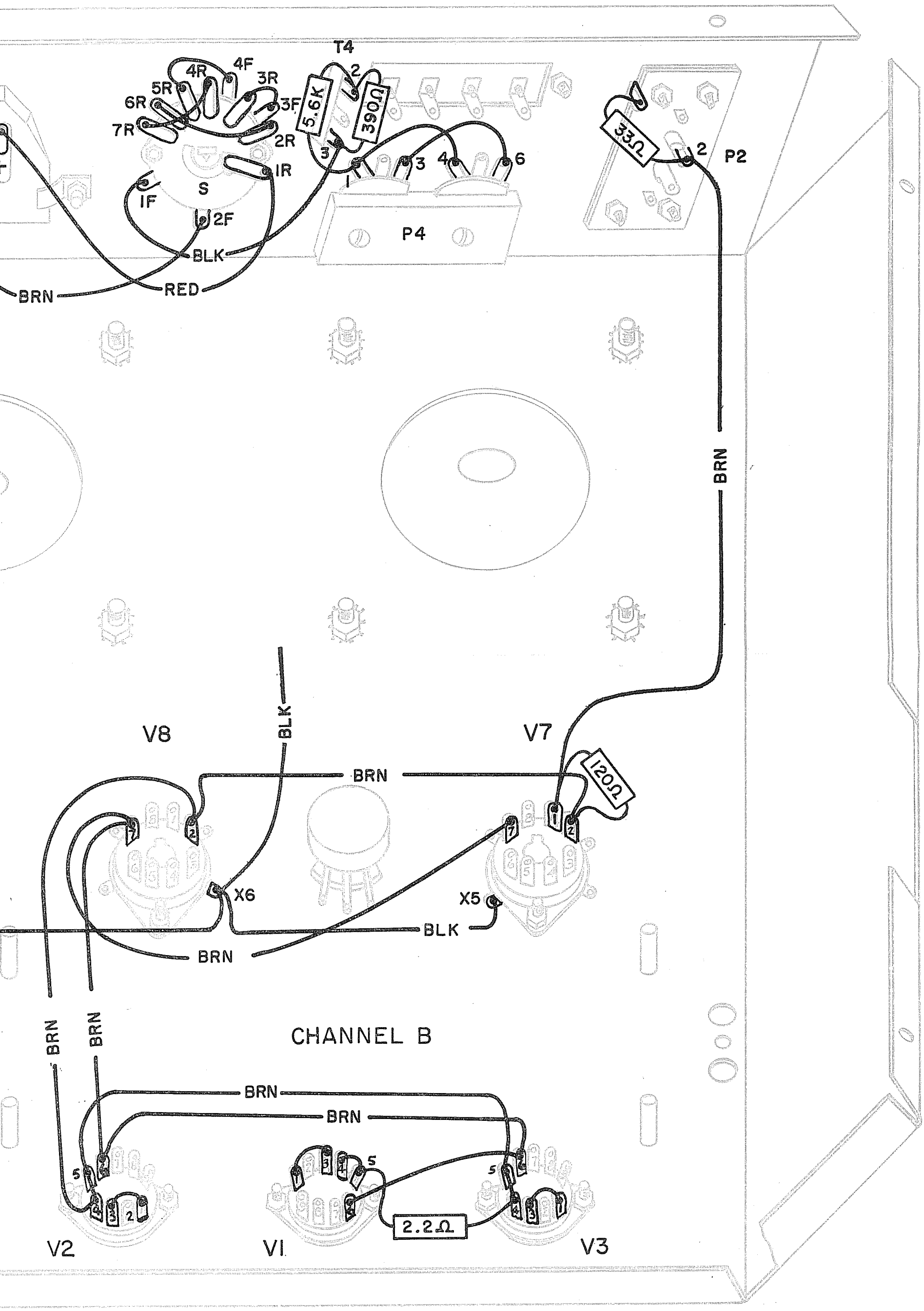




CITA

PRELIMINARY

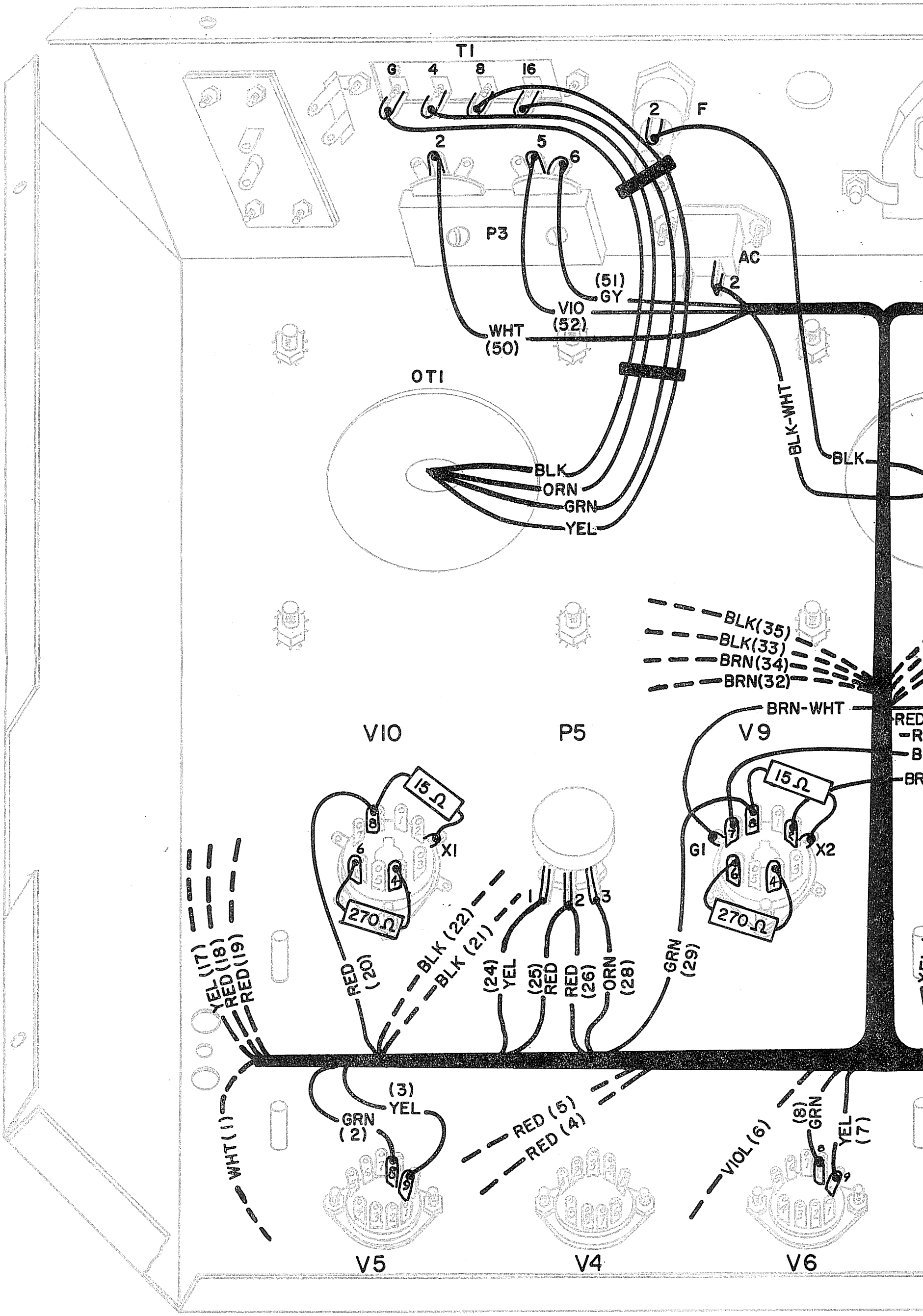
PICTO



ON II

HASSIS WIRING

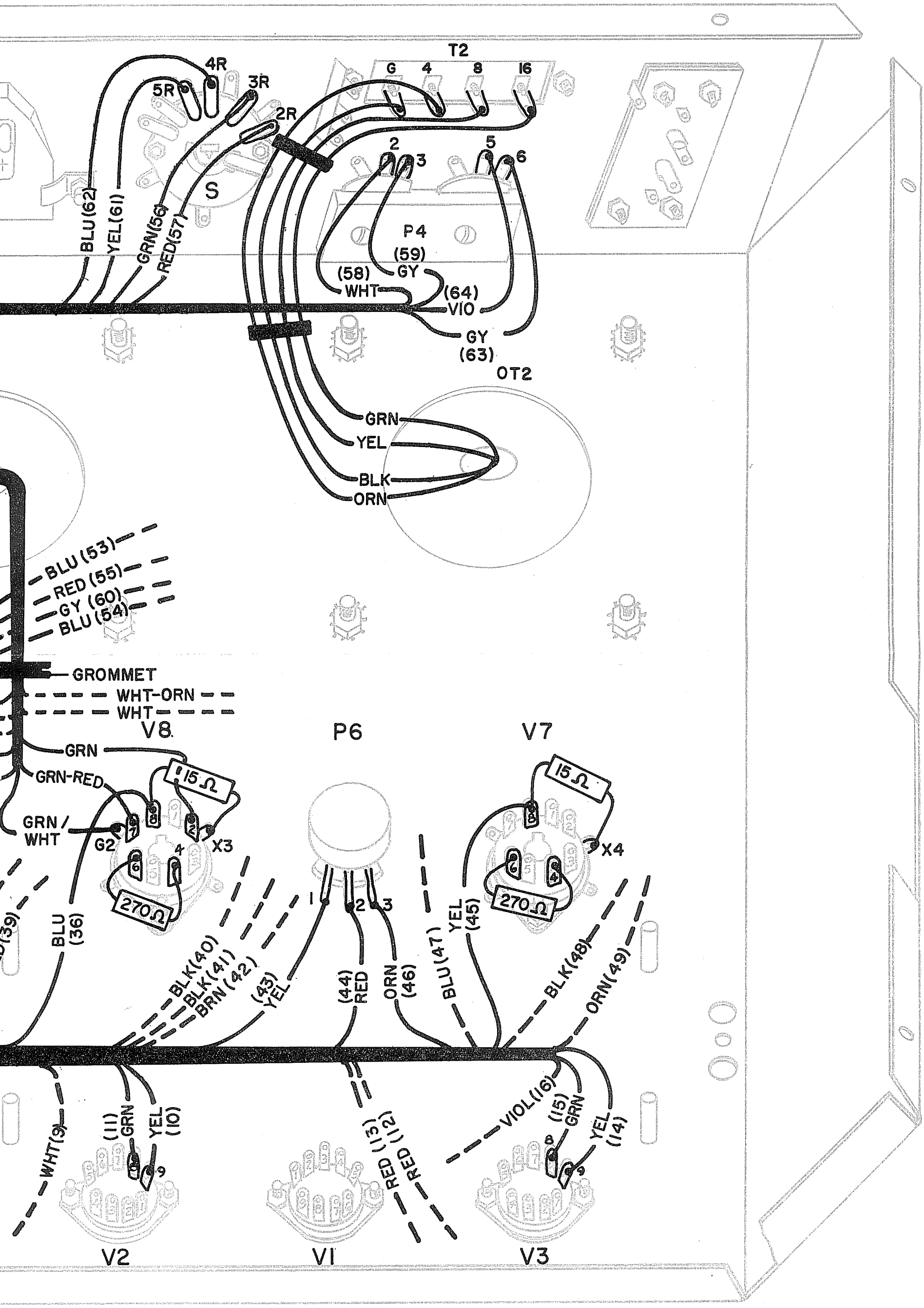
RIAL 5



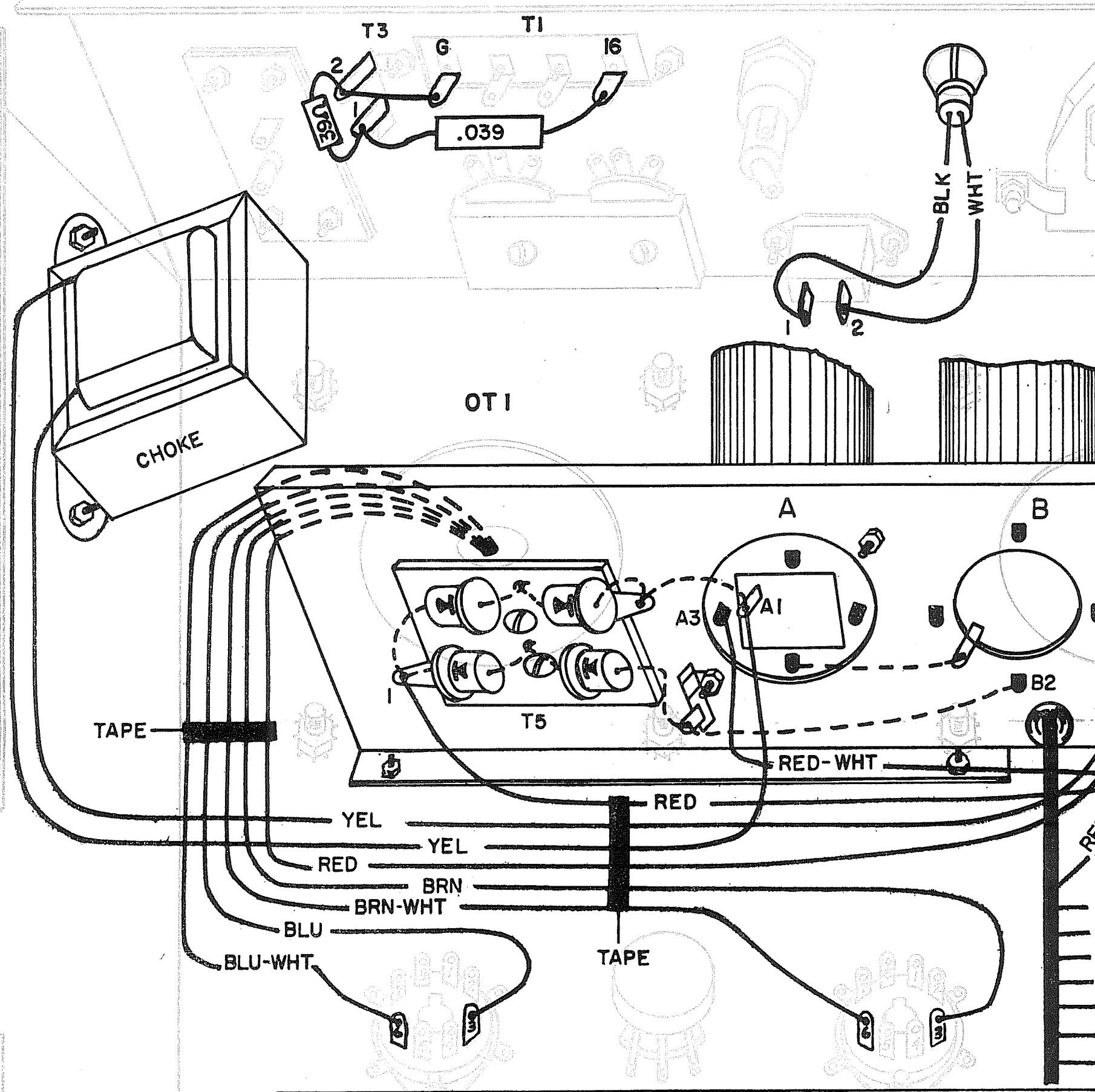
CITA

HARNESS

PICTO

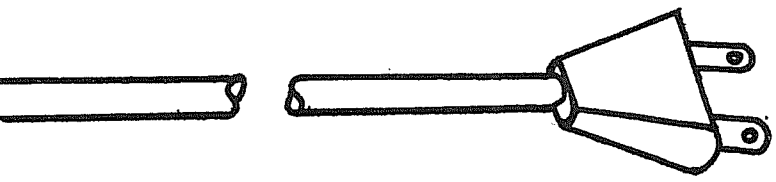


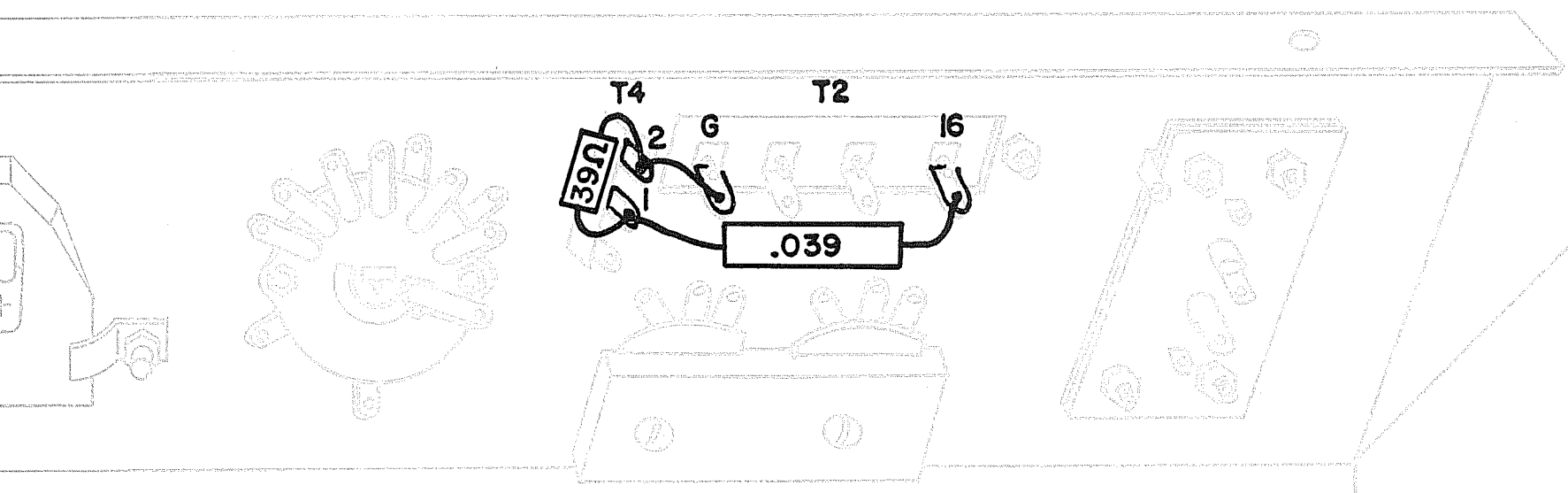
ON II
STALLATION
IAL 6

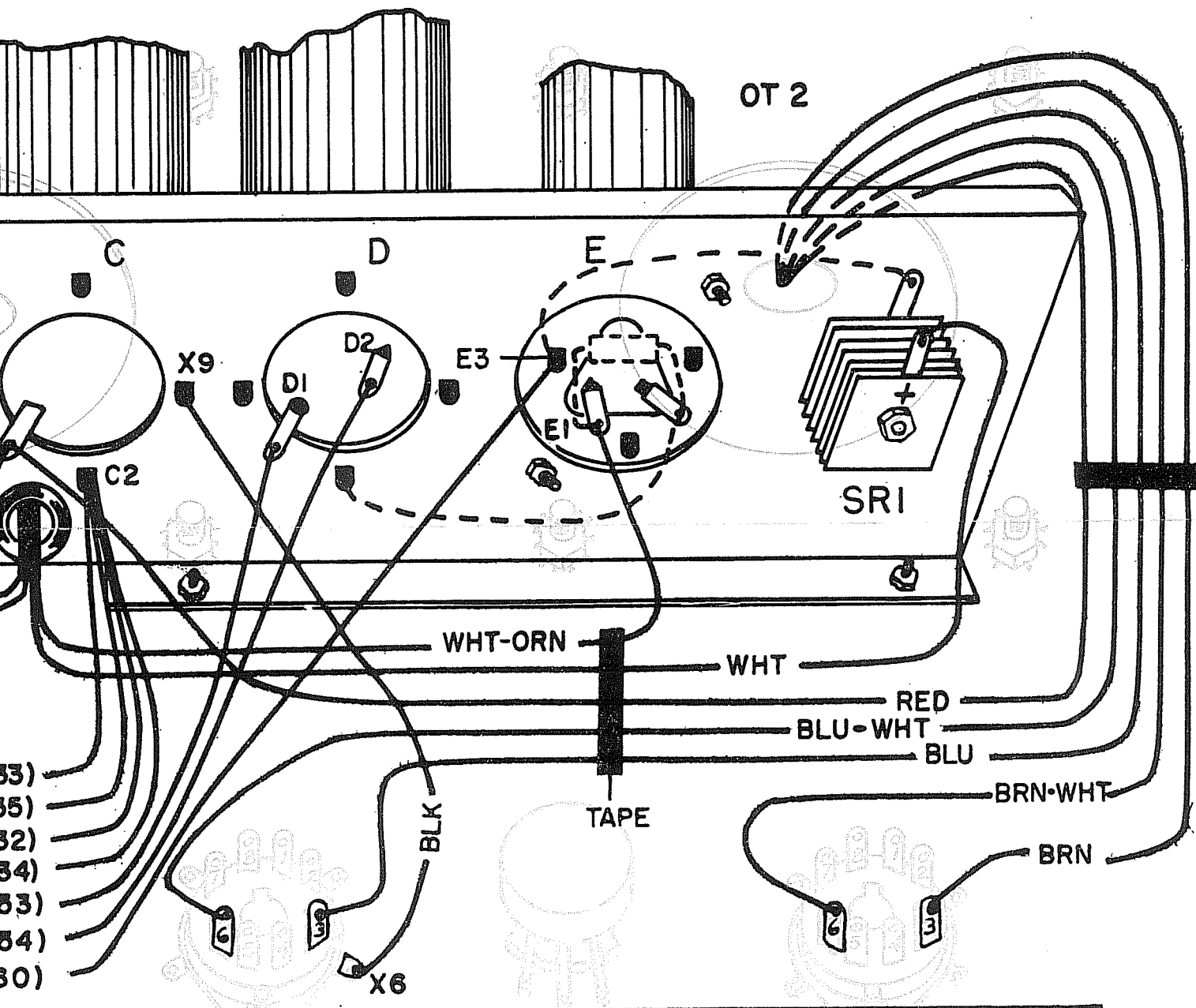


CITATION II

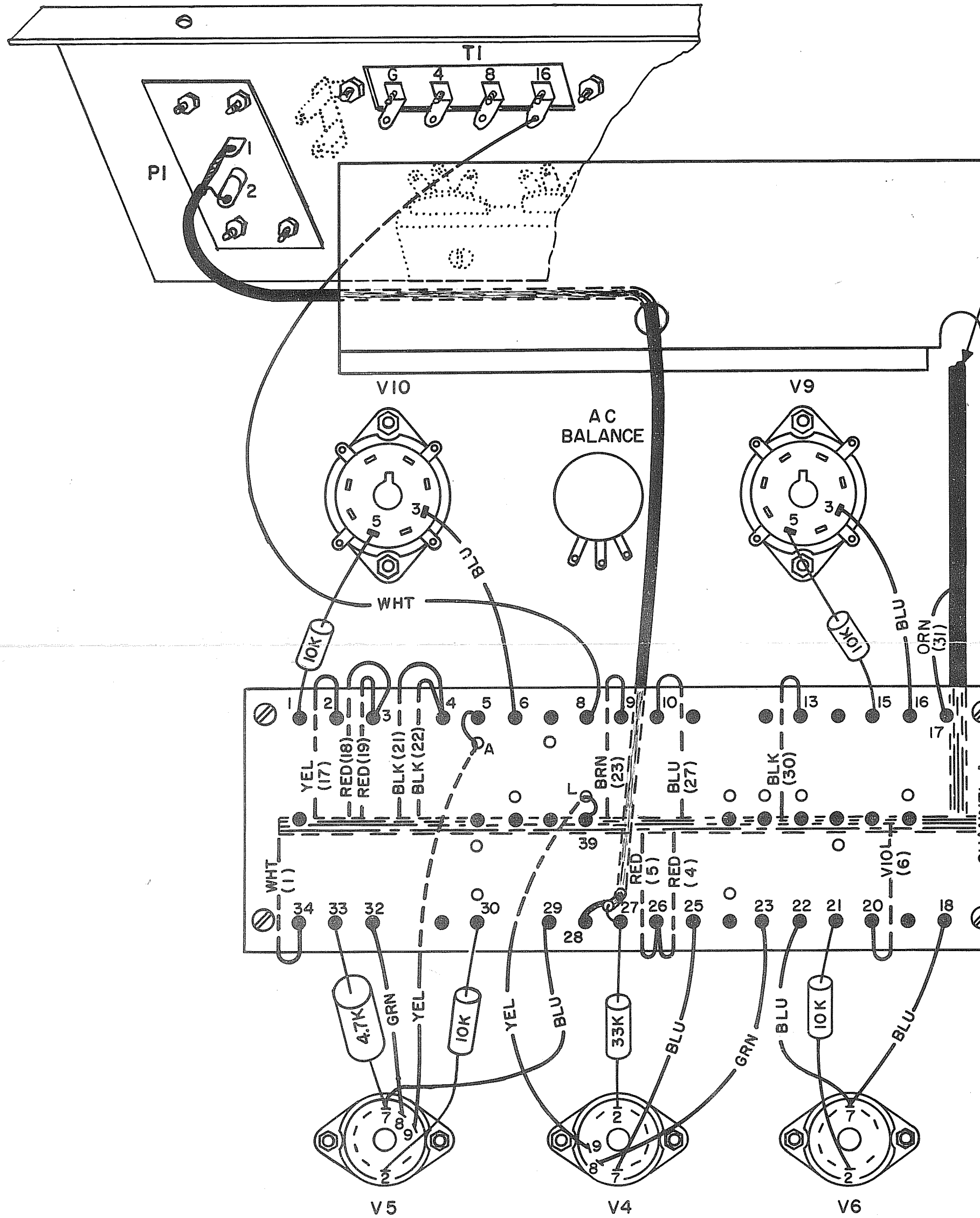
PICTORIAL 7





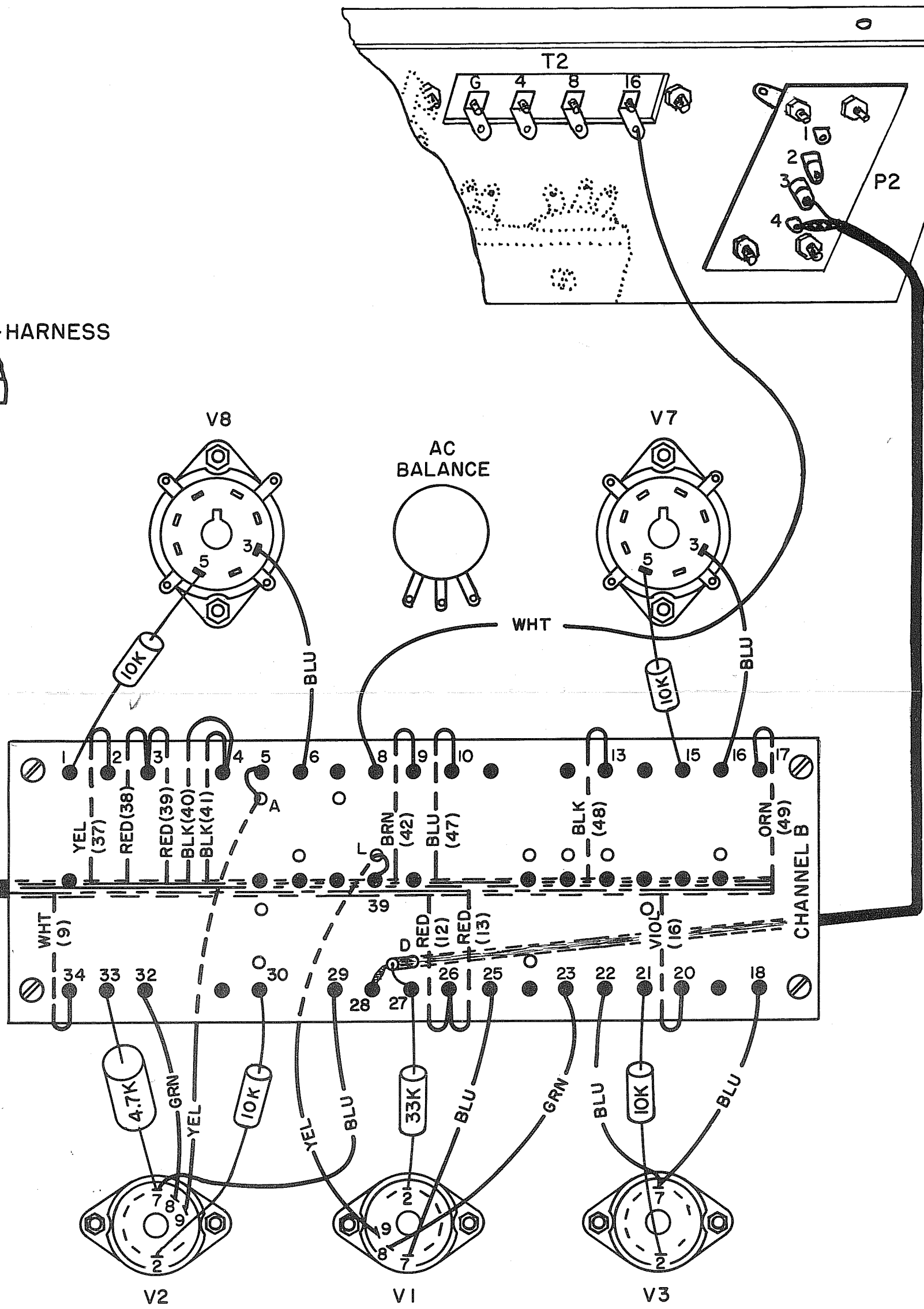


ASSEMBLY OF ELECTROLYTIC BRACKET TO CHASSIS



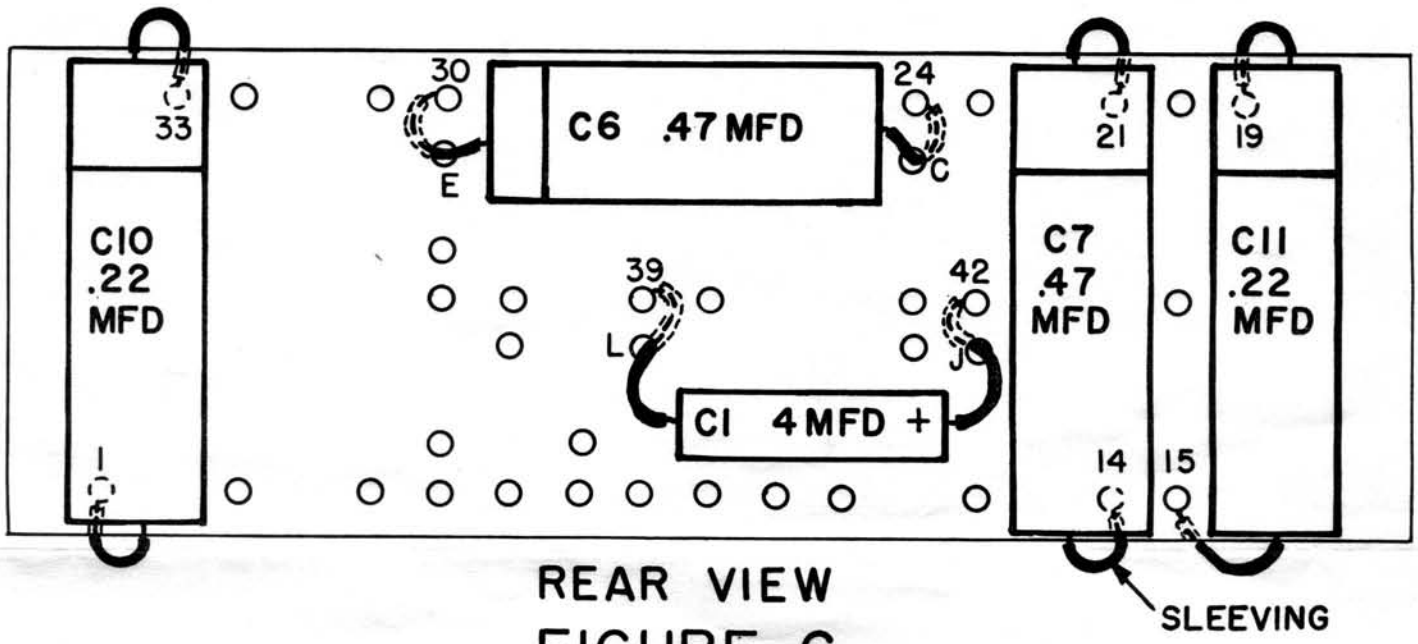
CHANNEL A
TB 2

HARNESS



CHANNEL B
TB I

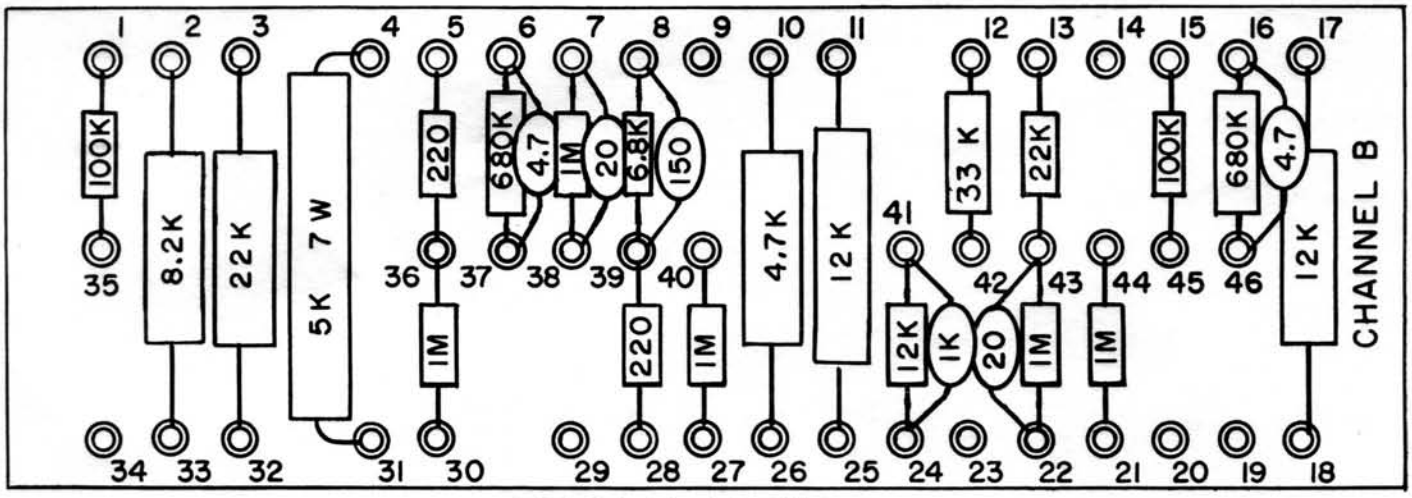
CITATION II
PICTORIAL 8
TERMINAL BOARD INSTALLATION



REAR VIEW

FIGURE C

(SLIP SLEEVING OVER CONDENSER LEADS)

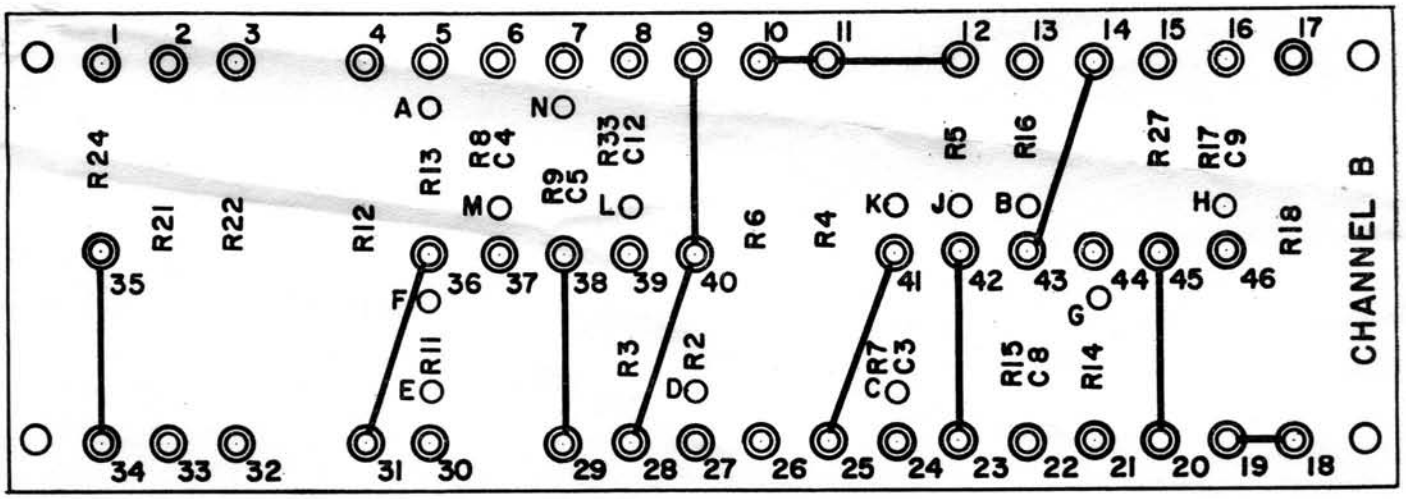


FRONT VIEW

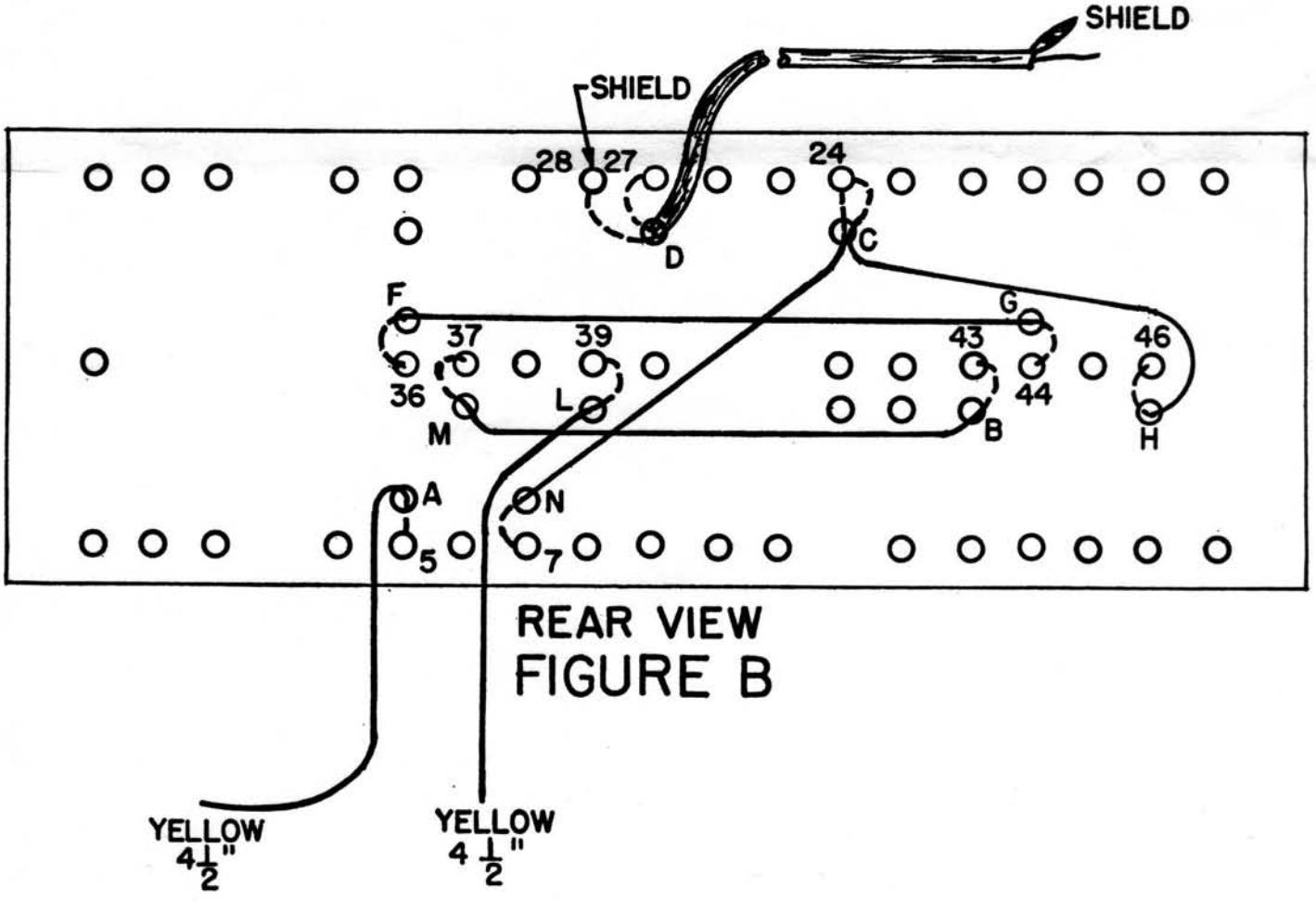
FIGURE D

PICTORIAL 3

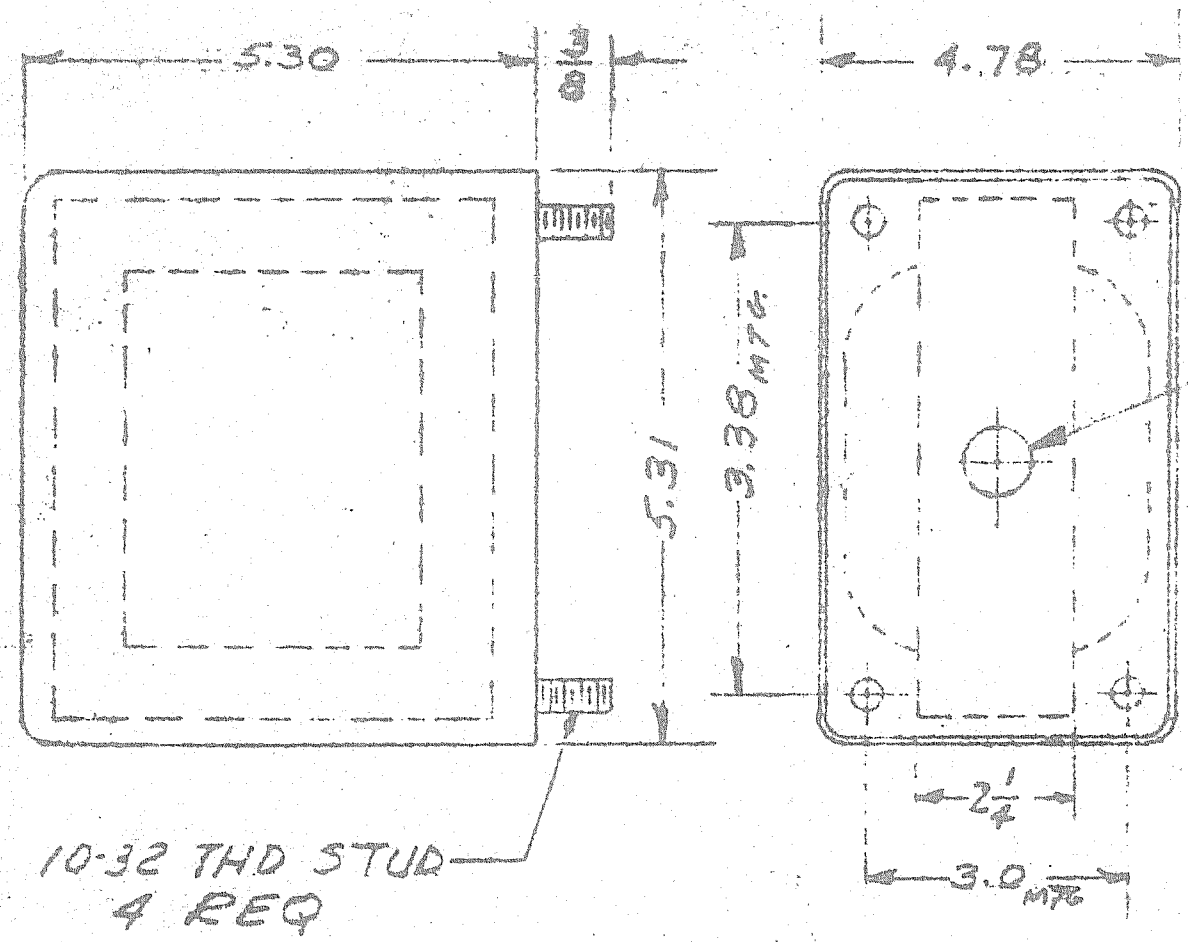
CITATION II
TERMINAL BOARDS
TB1 & TB2.



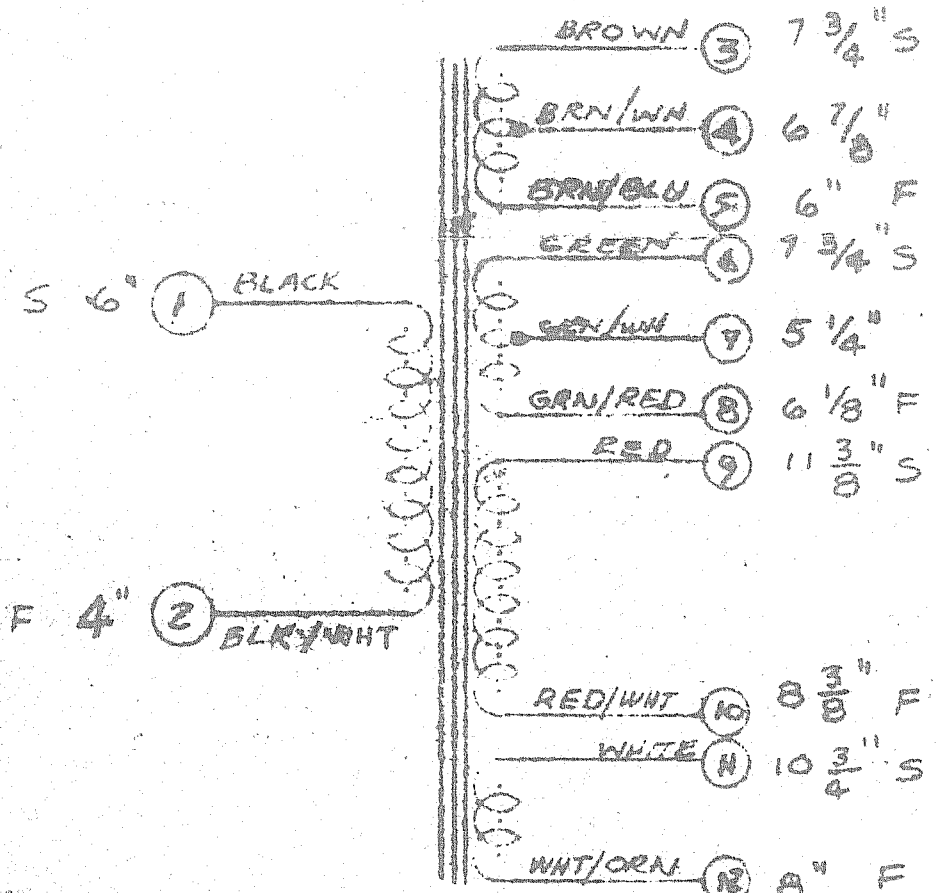
FRONT VIEW
FIGURE A



REAR VIEW
FIGURE B



(3) NOTE:
TRANSFORMER TO BE MADE IN
ACCORDANCE WITH MANUFACT.
SAMPLE # 455-146 SUBMITTEL
BY STANCOR ELECTRONICS, INC
FEB 5, 1962.


SCHEMATIC:
5 6" (1) BLACK
F 4" (2) BLK/WHT
BROWN (3) 7 3/4" S
BRN/WHT (4) 6 7/8"
BRN/SLU (5) 6" F
GREEN (6) 7 3/4" S
GRN/WHT (7) 5 1/4"
GRN/RED (8) 6 1/8" F
RED (9) 11 3/8" S
RED/WHT (10) 8 3/8" F
WHITE (11) 10 3/4" S
WHT/ORN (12) 8" F

MECHANICAL SPECIFICATIONS:

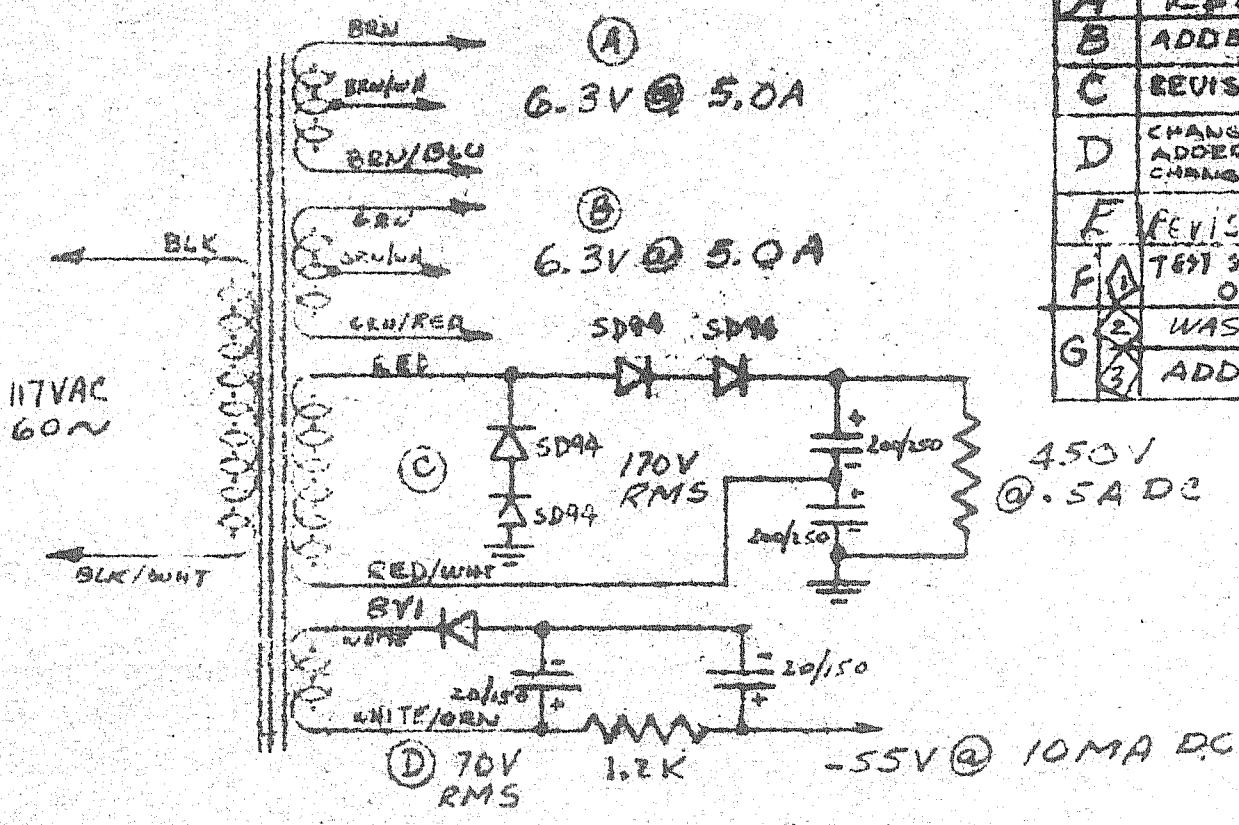
1. Stack to be 2 1/4 ins. thick and to be of _____ steel.
2. End bells to be: 1. Kobay Style
   2. Kobay Style
3. Lead lengths include 3/8" strip and tin. Tolerance - 1/4" + 1/2". Insulation and wire size to be in accordance with RETMA and U.L. Specs.
4. H-K Pt. No. PT3273470 to be stamped ON BOTTOM OF CASE WITH MANUFACTURERS NO.
5. Transformer to be varnish impregnated with a varnish which will not flow under operating conditions at temperature of 90C.
6. Transformer to be FINISHED ~~[illegible]~~ S407 BROWN (ORELITE CO.) HARD COMMERICAL FINISH

REMARKS:

1. Transformer to be made in accordance with good manufacturing techniques, so that....
   a) screws are not loose upon arrival at H-K plant.
   b) No lamination buzz under operating conditions.
   c) Laminations are to be squared up so that upon arrival at H-K plant transformers will not be cocked.
   d) No excess lacquer on leads or laminations.
2. Samples to be marked with H-K pt. No., Vender's pt. no. and date of submission on transformer of attached card.

ISSUE	REVISION	BY	CHK	DATE
A	RELEASED	AC		5/[illegible]
B	ADDED LEAD LENGTHS	JB		8/24/59
C	REVISED PRI LEAD LG	PJB		9/8/59
D	CHANGE COLOR OF LEADS ADDED START & FINISH CHANGED RESIST SPEC.	PJB		1/20/60
E	REVISED NOTE 7.	PJB		4/11/60
F 1	TEST SPEC 6 A&B WAS 0.69	PJB		5/11/60
G 2	WAS 50°	PJB		9/10/62
3	ADDED NOTE			

TEST CIRCUIT:



TEST SPECIFICATION:

1. WINDING	A	B	C	D
VOLT	6.3V	6.3V	170V	70V
CURRENT	5.0A	5.0A	0.5A DC	10MA DC

Tolerance on High Voltage windings ± 5 Volts unless otherwise specified. On filament windings: ± .25 Volt.

2. Heat Rise - Temperature shall not rise more than 40° (2) under the following specifications:

A. TRANSFORMER FULLY LOADED @ 117 V. LINE. LINE THEN RAISED TO 120 V

B.

FTR'D 3670 G

3. Shielding 1.
2.
3.

4. Wave Shape: Transformer is to be designed so that there is no saturation of the core at maximum output. Flux density to be low enough so that radiation around transformer is kept to a minimum. Waveshape at maximum output shall not have any notches or flattened portions.

5. Hypot: 1500 V.R.MS. for 30 secs. between each winding and all other windings and core.

6. D.C. Resistance of all windings.

(1) A. .069 Ohms
B. .069 Ohms
C. 4.93 Ohms
D. 12.0 Ohms
E. _____ Ohms

7. Flux Density to be 75 Kilolines maximum and all samples submitted for Engineering Approval shall bear actual flux density on sample tag.

ITEM	DRAWING	DESCRIPTION	REQ.

THIS DRAWING SUPERSEDES ALL DRAWINGS ISSUED PRIOR TO

HARMAN-KARDON INC.
520 Main Street • Westbury, Long Island N.Y.

MATERIAL:

POWER TRANSFORMER

FINISH: SEE MFGN SPEC. NOTE #6

DWN DATE 4/10/57 SCALE DO NOT SCALE DWG.
CHK DATE
APP DATE
SHOW DWG. NO. ON ALL PARTS OF TOOLS

UNLESS OTHERWISE SPEC'D
FRACTIONS ± 1/64 ANGLES ± 1/4
DECIMALS ± .005 HOLES ± .002
[illegible] NUMBER 63 [illegible]

FT32736 70-G